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TELEPHONE ENGINEER

Vol. II CHICAGO, JULY, 1909 No. 1

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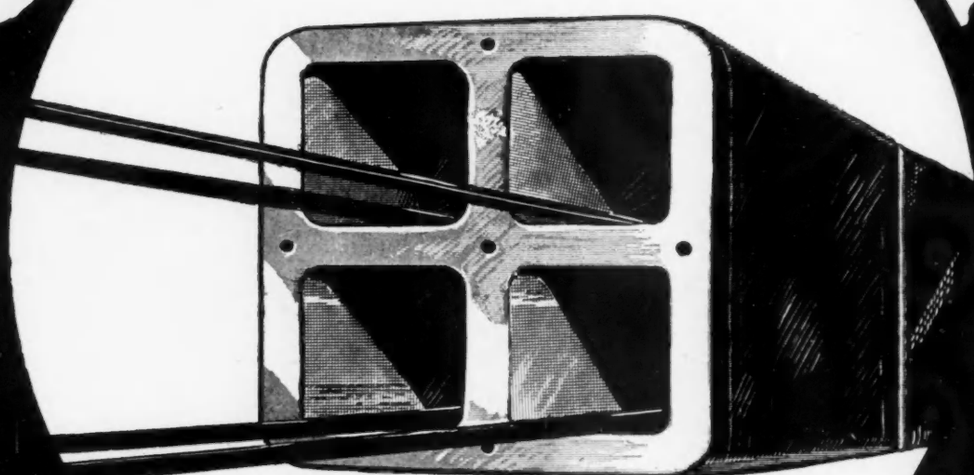

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TELEPHONE ENGINEER

VOL. II CHICAGO, JULY, 1909 NO. 1

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BEGINNING VOLUME II.

TELEPHONE ENGINEER made its debut against the advice of council. Please note the spelling. Of course, we took counsel with our lawyer, who has the happy faculty of telling us what to do and when to do it; in which he differs from some other lawyers who take fees for telling people what not to do. There is a difference between the first council, in this instance, and the second counsel.

But we started to say that this magazine was established against a protest.

Every telephone man in America knows the meaning of the words Bell and Independent. We do not regard a mere holder of telephone stock as a telephone man. He is necessary for telephone men, but not necessarily a telephone man. A telephone man includes those who have to do with designing, manufacturing, selling, engineering, contracting, operating and maintaining. These people all know what the Bell company stood for in the beginning. They also know what the independents stood for in the beginning. Mind you, we are talking about conditions when competition made its appearance. It was a merry war with an occasional bon-fire!

However, that was quite some while ago. Lots of things can happen in fifteen years and lots of things did happen. Some things can happen in less time than we have named and other things never happen. This thing hasn't changed with the Bell—it stood for a single system then and it stands for a single system now. It is not necessary to hunt for that secret with a dark lantern. It blazons out like a search light.

This thing hasn't changed with the Independents—it stood for sentiment then and it stands for sentiment now. We are not decrying sentiment, for it has some splendid arguments, but this thing we call sentiment in the telephone business must have a lot of encouragement. You must buy it an ice cream soda and some bonbons and a bouquet, now and then, or some one will turn its head. You could satisfy it for a while with old Kit hitched to Dad's Sunday buggy, but the chap over on the adjoining section stands a good show of sweeping along in his bubble cart and the stuff is off again.

The Bell has been changing its tactics, but not its belief. It offers many things today that it did not formerly concede.

The independent telephone manufacturer — some of is not even holding to a vigorous campaign of aggression. Sentiment formerly was a chief asset. Today it is only one factor—strong in spots, tempered in others, docile as Mary's little lamb in the places where it was once rampant.

The independent telephone manufacturer—some of him—is responsible for the lingering drift of sentiment. He is the council who protests against a publication which dares to keep abreast of the industry. It was his feeble

little effort which sounded the death-knell of TELEPHONE ENGINEER before it was started. It is his rasping cackle that tells Jim Ainsworth that this is a Bell organ.

Let it be known among all fair-minded men that TELEPHONE ENGINEER is no part of the Bell system. It is an advocate of intelligent operation of telephone plants. It is without bias. It is owned by individuals who have no other telephone interests. It would tell the truth about telephone conditions, believing now as it did at its birth, that the commercial side of the business considered broadly as including the interrelations of manufacturers, plant owners and telephone users has developed into a condition very similar to other commercial industries and that it promises to continue securely on this basis indefinitely into the future.

The council who would protest against an impartial advocate of competitive telephony is asleep at the switch. The indolent management, forced by constantly increasing prices of raw materials and a competitor's ability to contrive labor-saving machines to reduce shop cost, finds profits narrowed to a thin margin. There is apt to emanate a groan for the times that were. The conclusion is back to the first love—bolster up the sentiment!

We have already pointed out the great need of a manufacturers' association that would be broad enough to remedy the evils which exist. We have suggested those things a society of the kind might profitably consider, leaving unsaid the harmful practices which reduce profits and tend to stagnate the industry as a whole.

The danger of slit vision lies in the pessimistic view it is so apt to encourage. It is folly to bewail a condition which is easy of adjustment. The optimist—whether he believes in advertising or not—will look upon a rapidly growing country and note the equipment it must have. He will consider replacement; he will make some calculations among the farmer's homes. There are estimated to be 6,000,000 of them. We doubt that more than a million are supplied with telephones. And if a farmer does not need a telephone, no one does. There are new and interesting phases for telephone service all the time. There is opportunity today for the vigorous element that will go out into the open and get what is rightfully due it on a basis of quality and price. Sentiment is as dead as a mill-stone outside the horizon of the select council which would add to its levity by denying itself an advertising opportunity.

Gentlemen of the council, this is a journal of protest. It stands for betterment in telephone conditions without regard for name-plates. It has crossed the danger line of experiment. It has succeeded against the advice of council. Please note the spelling.

COMPETITION IN CHICAGO.

THE time is ripe for the next session of the Illinois legislature to put across a compulsory inter-connecting telephone act. The Illinois Tunnel Company will then be able to unload its franchise to operate a telephone system in Chicago to the Chicago Telephone Company. The arrangement will be mutual, for the Tunnel company wants to sell and the Telephone company wants to buy.

The only way to prevent such an arrangement is to have an independent operating organization, formidable enough in personality and cash to buy the Tunnel company's rights, in the event they are not already under option by the Telephone company. But, even so, it will take the biggest organization of independent interests ever planned to secure a franchise and put in a competing plant in Chicago.

The clamor of outside independent companies for entrance to Chicago has no meaning to its city councilmen. That is borne out by the reception that was given to Mr. Critchfield's figures early last month. The council wants to be shown that a franchise in hand is worth several in the bush.

There are two independent telephone plants in Chicago right now. Both are operating, but both are a joke in the eyes of the public and in the eys of the men who have the franchises to operate. The argument against the Tunnel company—the thing that has prevented the sale of its franchise—is the best that can be produced. It has no right to sell something it hasn't earned. It has been given time, and still more time, to earn its franchise, but it is too deeply engrossed with the freight business ever to become a competitor for the Chicago Telephone Company. If the independents want to build Chicago they might, having the means, find ample foundation by looking into the franchises of two independent companies now enjoying franchise privileges in this city. It might be hard to find one of them, but it could be run to cover in the Hyde Park district, for it is there, just as surely as the Tunnel company is on Fifth avenue.

INDEPENDENT CONSOLIDATION.

THE recent decision of Judge Tayler on the contracts of the United States Telephone Company has had at least one important result. It has greatly increased the number of independent telephone men who are willing to consider consolidation of independent forces. It has long been argued that local management and control of local units was a source of strength to the independents, but it is becoming obvious to even the most rabid of anti-Bell crusaders that unification of interests is the order of the day.

The National Telephone Company, with headquarters at Wheeling, West Virginia, in its consolidation of independent operating companies of West Virginia, eastern Ohio and western Pennsylvania, is following a plan which shows that its management has profited by a study of the weak points in the original Bell methods. It has recognized the salutary effects of local control, and is arranging to operate its several plants independently. Thus the local backers are left in possession of bonds and preferred stock, while the National holds a majority of the common stock only.

The advantages of this arrangement are obvious. The consolidated interests secure all the benefits of a single head, and are enabled to present a solid front to the enemy without the distraction of internecine strife; while the strong support of the local investor, which has always been the very back-bone of the independent faction, is retained and even increased. There can be no question as to the superiority of this system over the Bell plan of keeping the local investor always in the minority, and so sacrificing a factor of power which, had it been cultivated, might have made telephone history read very differently.

Independent consolidation is inevitable. The peculiar opportunities and privileges secured by large interests are as attractive to telephone men as they are to steel or railroad men. All that is needed to precipitate a general rush to merge local interests under a single controlling head is a brilliant example or two; and the ex-

amples are already forthcoming. A tendency to consolidation has long existed among the Ohio independents; and with the warning of Judge Tayler's decision and the influence of their eastern neighbors, the Ohio merger will probably be consummated within the year.

The United States Telephone Company already occupies a strategic position controlling long distance lines that must inevitably be used in any New York-to-Chicago independent line, and forms a nucleus for a very effective combination. An efficient Ohio-Indiana independent consolidation would control the telephone situation in those states, the competing Bell company, the Central Union, being notoriously weak in that territory.

It is estimated that the National Telephone Company will control fully as many stations as its Bell competitor, the Central District and Printing Telegraph Company; and with both factions of equal strength, superior efficiency in organization and management of either company will be much more apparent.

Independent securities have always found difficulty in effecting entrance to the stock exchange. This fact has been laid at the door of prejudice, malice, misunderstanding—everything but the real reason. When the independents, through consolidation, can show financial figures big enough to interest the stock exchange, they will not be debarred.

One Hundred Dollars in Cash Prizes

IN an effort to develop a remedy for the conditions of incivility and discourtesy which are so common between telephone users, and which tends to bring adverse criticism upon all telephone service, *Telephone Engineer* offers to its readers a series of four cash prizes for the four best short articles or essays on telephone etiquette. The conditions governing the competition are as follows. The cash prizes offered are:

First Prize, $50.00. Third Prize, $15.00.
Second Prize, $25.00. Fourth Prize, $10.00.

Articles shall not exceed two thousand words in length, and may be as short as desired.

Manuscripts should be typewritten, double-spaced and sent folded, not rolled.

All manuscripts or inquiries should be addressed to "Contest Editor, Telephone Engineer, Monadnock Building, Chicago, Ill."

Receipt of manuscripts cannot be acknowledged, nor will unavailable articles be returned.

The contest will be closed September 1, 1909, and prize winners will be announced in the October number of *Telephone Engineer*; the prize winning articles being printed as soon thereafter as possible.

Articles will be read and prizes awarded by a board of judges, whose personnel will be announced in *Telephone Engineer*.

Telephone Engineer reserves the right to buy, at its regular space rates, such articles as are deemed desirable, although not prize winners.

ON ENFORCED APPRAISALS.

REGULATION of rates by legislation is an artificial arrangement at best, even with the guidance of an independently directed inventory and appraisal. Without such guidance, legislative regulation is oppressively arbitrary. The only natural regulation of both rates and service comes through competition. When a company raises its rates above those of its competitor, in spite of that competitor's equally efficient service, the reason must lie in one of two conditions—either the company raising its rates is actually in need of the higher rate, or it is in need of a new management.

Attempted telephone competition in New England, where the Bell is strongly entrenched, opened the eyes of the telephone patron to certain possibilities which suggested investigation. A clamor arose that eventually took the form of a petition. This finally drew the attention of the Massachusetts Highway Commission, who assumed the responsibility of conducting an appraisal of the whole property of the New England Telephone & Telegraph Company.

At the enormous cost of something like $100,000, this commission has made available a complete record of all properties belonging to the telephone company.

The net result places an appraisal value on the property of $46,540,819. The par value of the company's outstanding stocks, bonds and notes is $38,939,850. The commission has learned that the company pays from its earnings such expense items as engineering, interest, and new construction. The commission will be obliged to determine whether such expenditures should be made from capital account.

The knowledge gained, when considered with the company's record of annual operating and repair costs, gives the commission probably the best foundation figures ever collated upon which to measure the reasonableness of operating costs. It will now be definitely known whether the subscriber is paying an exorbitant rental or not.

The object of the appraisal will be to create new schedules of equitable rates, or approving the old schedules, as the case may be.

The inventory was undertaken with the full consent and approval of the telephone company, and it is remarkable that the company bears the expense.

A large amount of information valuable to the company, such as cost data, depreciation values, etc., was obtained, but it is hardly probable that the value of this information is at all in proportion to its cost.

The efficiency of an inventory of this kind is directly proportionate to the inefficiency of the company whose property is being investigated. In other words, a certain proportion of the work merely duplicates work previously done by the telephone company; and the result of that

portion of the inventory adds no real information to that already a matter of record with the company. This ineffective portion varies according to the amount of care and labor which the telephone company has spent in compiling similar statistical data for its own information. Furthermore, every subsequent inventory of this nature must be less efficient than the preceding one, because of the continually increasing difficulty of avoiding repetition of similar work already done.

Of course, the function of the inventory and appraisal is to serve as a basis for a proposed equitable adjustment of rates. There is no question that the rates so provided are satisfactory to the state, because they are founded on figures. They may still be too high, from the viewpoint of the public; or too low, according to the company.

It is to be hoped that a continuation of such prodigality on the part of telephone companies will not endure. The problem of returning satisfactory dividends to telephone investors is large enough already, without imposing added penalties. The constant drag upon earnings to accommodate the demands for service; the paradoxical condition, the larger the system, the greater the operating expense; the unforeseen havoc wrought by fire or storm; the still unfamiliar factor of depreciation; the unexpected drain of litigation; all combine to hold the telephone manager to the straight and narrow path of rigid economy and the constant dread of unusual or unknown expense. Even competition itself may cause an additional burden of expenditure; but competition aids development of territory and brings new patronage. The New England appraisal will give little more for the company's money than a check on old figures.

WHO CONTROLS WESTERN UNION?

THE rumor is current that the American Telephone & Telegraph Company has obtained a controlling interest in the Western Union Telegraph Company. None of the officials of either company has anything to say, but it is significant that when the Western Union cut its dividend, not long ago, the stock held firm—due to large buying, which seems to be traced easily to the A. T. & T. Co.

Whatever has happened recalls a string of facts which bear strangely upon a competitive condition. In the street window of every important Postal telegraph office in the country is the imitation of a large blank addressed to the public, which points out what the Postal has made possible as a competitor to the Western Union. The Mackey Company owns the Postal.

The relations between the American Telephone & Telegraph Company and the Western Union Telegraph Company, so far as the public is concerned, have never run smooth. There has been much litigation and some vicious spite work, yet the A. T. & T. Co. is supposed to own large blocks of its stock. The Mackey Company is the largest holder of A. T. & T. Co.'s stocks and bonds.

It must not be forgotten that the Mackey Company has some very important things to do with cable companies and with independent telephone companies.

Now the point arises, what does competition mean between telegraph companies, when the owner is largely the same organization? What will it mean among telephone companies when "unified interests" will urge the advantages of a single system from one source and "down with the trust" from the other?

We believe in certain regulations that will mean economy in manufacture and operation, but we also believe in competition which competes. The spirit of the Mackey Company tends to a very real monopoly of the electrical transmission of intelligence and it seems to be making some hay, as well as some rumors.

UNDEVELOPED USES OF ACCOUNTS.

THE paper on "Some Undeveloped Uses of Accounts," by Comptroller C. G. DuBois of the American Telephone and Telegraph Company, which we reproduce in abstracted form on page 27, contains a number of ideas that will doubtless be new to some of our readers. It is our regret that lack of space has compelled us to omit portions of his discourse which, perhaps, are as vital as any of those transcribed. Mr. DuBois' purpose to cause the scheme of accounts to show the relative value to the business of the individual cannot fail to interest every alert user of the work of men.

As the author states it, the burden of proof rests on every man every day to show that he is positively efficient, and the same principle applies to every group of individuals acting together as an organization.

Every result which betrays inefficiency must be attributed to the inefficiency of one or more individuals; and individual inefficiency and its correlative have a disproportionate effect upon the whole organization through the influence one has upon another. It is obvious that the success of any organization depends altogether upon the efficiency of its personnel.

Passing from the contemplation of individual to that of organization efficiency, it is plain that where this exists in high degree it must be due to more than a merely mechanical analysis of conditions. Any system of accounts or records intended to provide a means for the greatest development of a telephone property must have available such statistical information as will indicate with considerable accuracy the fate of any contemplated improvement before any investment is made in such improvement. Information of this kind must necessarily go outside purely telephonic data, no matter how reliable the latter may be. The broadest interpretation of the subject of intercommunication between people must be reduced to figures.

It is immediately obvious that population statistics bear directly upon telephone development. It is just as true, though perhaps not quite so plain, that character of population, as well as occupation, are equally important to the telephone man. Areas largely populated by certain races, or communities of certain trade workers, cannot be expected to return as many subscribers per population unit as the white agricultural districts. The relations existing between communities must also be studied. Railway and trolley routes and rates thus have an important bearing on telephone development. All these factors, and many others, act as aids to the personal efficiency whose inevitable result is organization success.

To those who may see in the correlation of such data an apparent great increase in the number of records and the labor of using them, it is pointed out that the contrary condition will result from the elimination of indefinite records whose use and value are all in perspective and quite hypothetical.

The Charles City Telephone Company, of Virginia, has its director's meetings opened with prayer, a minister being summoned for that purpose.

Telephones in the New York Police Bureau

By A. C. Rowsey

WITH over six hundred miles of aerial conductor, 1,776 miles of underground cable and a half dozen miles of submarine cable connecting seven switchboards with 460 telephone stations, and this service augmented by a separate system of telephone signal patrol boxes, nine hundred in all, the Bureau of Electrical Service of the Police Department of New York, now in process of regeneration under the guidance of O. B. Arland, is gradually becoming a model for consideration by the police of other large centers of population.

If the plans of Police Commissioner Bingham are carried out, the development of the service will not stop until a wireless apparatus is installed in the tower of the new police headquarters in Manhattan, and on the harbor patrol boat, "Patrol," and until all the launches that patrol the 341.22 linear miles of water front for the protection of shipping, etc., are equipped with land telephone bringing them under the direction of the inspectors at all times.

All of the work of renovating the bureau has been done by a staff of one hundred and seven men, all but ten regular members of the police department, working under Mr. Arland, who is only a temporary appointee entrusted with the work of bringing the service up-to-date.

Police Switchboard at Mulberry Street Station, New York.

During the past year every foot of the plant has been tested, reported upon and repaired. For the first time in the history of the department the locations of underground and aerial conductors, instruments, etc., were reduced to maps and diagrams. Previously only a few of the attaches of the bureau had any

knowledge of the whereabouts of any part of the plant, for there had never been an inspection since the plant was started. It kept on growing and tangling itself up in a weird fashion, until it was impossible to tell how a police secret got out of the department.

The traffic of the wires amounts today to about two million messages yearly. Of this number only 881,953 were recorded last year, the balance being official daily routine business of the department. In 1907 the recorded messages amounted to 906,186. But in 1907 long official orders were read over the wires, tying up traffic for hours, which today go in printed form by mail, leaving the wires for speed demands.

The result is that within five minutes every one of the telephone stations in the greater city, including hospitals, morgues, courts, district attorney's office, charity and correction and human and animal societies, can be plugged up and a general alarm sent out simultaneously through the five boroughs, allowing one minute for each borough, without delaying the regular business of the bureau.

The longest call from City Island in The Bronx Borough to Rockaway, Queens Borough, is over 50.05 miles of conductor. From the switchboard at police headquarters, Mulberry street, Manhattan, both stations were plugged in and connected in less than 28 seconds, and an order was delivered to both stations.

To give an adequate idea of the part played by the Bureau of Electrical Service in the work of the Police Department of New York, it is necessary to present some figures and facts on the department, and the city.

Greater New York contains 306 square miles. It has 2,911 miles of streets inhabited by about 4,422,685 people of all nations.

The city is divided into five boroughs. Staten Island, six miles from the battery wall of Manhattan, close to the New Jersey shore, is Richmond Borough. Brooklyn Borough, the old city of Brooklyn, reaches from the mouth of the East river diagonally across Long Island taking in the harbor side around to Manhattan Beach. Queens Borough takes in the rest of the Long Island East River shore, and crosses Long Island to take in all the beaches on the ocean front to Rockaway. Manhattan Borough is the original city, on Manhattan Island. The Bronx Borough runs to the Yonkers city line and up the Sound to Westchester village.

This territory is laid out in fifteen inspection districts. The first contains seven police stations, and one court; the second, seven stations and two courts; third, five stations; fourth, four stations and one court; fifth, four stations; sixth, four stations and one court. These are in Manhattan. The seventh inspection district consists of nine station house precincts and one court in the Bronx. The eighth has eight station houses and five courts in Brooklyn; the ninth seven stations and one court; the tenth six stations and two courts; the eleventh four stations and one court, all in Brooklyn. The twelvth district takes in all Queens, containing twelve police stations. The thirteenth includes all of Richmond, four police stations. The fourteenth district is the traffic division operating all over the city from different precinct station houses. The fifteenth inspection district takes care of five precincts and one court in Brooklyn. Then there is the detective bureau with nine branches under one inspector, and the various squads and bureaus of health, tenement, information, licenses and equipment.

One borough inspector is in command over all the inspection districts in Brooklyn. He receives his instructions and acts under the chief inspector, whose office is at police headquarters, Mulberry street, Manhattan Borough. The chief inspector has a staff of six captains whose business it is to distribute his orders to district inspectors, and to inspect precincts to see that the district inspectors are not falling down on their work. For the district inspector is no longer a czar in New York. He is merely a senior captain.

In each of the five boroughs there is a borough police headquarters. At it is stationed a district inspector. Formerly the inspector stationed at the borough police headquarters was a borough inspector and had jurisdiction over the police of the entire borough. With the exception of the borough inspector at borough headquarters, Brooklyn, they are no higher in rank than the rest of the inspectors in the borough.

At each borough headquarters is a switchboard, and the detective bureau in Manhattan has one while its branch in Brooklyn has another. This gives seven switchboards. They are tied to and centralized upon the switchboard at the Manhattan headquarters, by trunks. Each switchboard is localized in its own borough, radiating to the courts, morgues, hospitals, humane and animal societies, police precincts, etc. The connections of each switchboard are brought direct to the central switchboard at police headquarters, Manhattan. Two cables start from the Bronx with the Bronx connections and take in all the stations in Manhatan on the way downtown to police headquarters. The Queens Borough cable brings the connections of the Queens Borough headquarters switchboard, three cables tie the Brooklyn connections to the Manhattan headquarters, and until recently a cable from Staten Island brought in the Richmond switchboard's connections. Recently, owing to the destruction of the cable by the ice in the Upper Bay, it has been found necessary to use the New York and New Jersey Telephone Company's wires through New Jersey.

The Brooklyn switchboard has six positions. It operates over 80 miles of aerial conductor and 550.5 miles of underground plant. The Bronx switchboard is two position, and has 40 miles of aerial conductor, 164 miles of underground cable and 3.6 miles of submarine. The Queens switchboard has one position, connected up to 157 miles of aerial, 134.25 miles of underground and 1.25 miles of submarine. The Richmond switchboard has 50 miles of aerial conductor.

The Manhattan police headquarters switchboard, the core of the system, has eight positions. Locally it is connected with 14 miles of aerial conductor and 437.33 miles of underground cable.

It can thus be readily seen that while the central headquarters in Manhattan can connect with any precinct in any borough, through its tie lines to the local switchboard, no local switchboard can communicate with a precinct outside of its own borough without going through the Manhattan switchboard. It is also clear that but one inspector in each borough can get a direct connection with any precinct in any borough. And that the inspector is the one in command at the borough police headquarters. Thus a raid can be pulled off over the head of a district inspector without him being in the least aware of the fact, by simply suppressing the news at the local borough switchboard so that it does not leak from the precinct where it

occurred, through the local switchboard, to his connection.

This is the core, but not the entire equipment of the Bureau of Electrical Service.

There is, in addition, the signal box system rented from the New York and New Jersey Telephone Company, consisting of 900 lines and instruments and 38 switchboards. This is known as the patrol signal stations system. These lines run from precinct posts to the local precinct house only. They are of the common battery type; the moment the door is opened a signal falls on the switchboard in the station house, and by the time the patrolman picks up the receiver he has his lieutenant at the other end. The regulations require a call once an hour.

In Manhattan, there are 43 precinct station houses. Of these, 30 are equipped with switchboards. In the borough there are 661 signal stations. Of the nine precinct station houses in the Bronx, eight have switchboards. There are 204 signal stations to the borough. In Brooklyn there were 340 such stations, but owing to the process of regeneration now going on, only 30 are left to the 30 precincts. The system in that borough was found to be antiquated and inadequate. The lines terminated simply in one instrument which was connected to the various circuits by means of a plug. The switchboard will be in every precinct house before the commissioner is finished with the bureau.

This signal system has no connection with the system previously described. It is leased at an annual rental of $24,000 and its lines are carried from the posts to the station house by the New York and New Jersey Telephone Company's cables, which company also leases the borough switchboards to the bureau, and supplies the electric current.

For the accommodation of the public in each borough who may wish to call up the local police headquarters, or central headquarters at Manhattan, 40 trunk lines are leased from the telephone company and connected from the local exchanges to the borough headquarters switchboards. Thus the central switchboard at Manhattan has 23 of these trunk lines coming in from the Spring street exchange. Three more run to the Bronx headquarters, eight to the Brooklyn headquarters switchboard, four to the Queens Borough headquarters and two to the Richmond Borough switchboard.

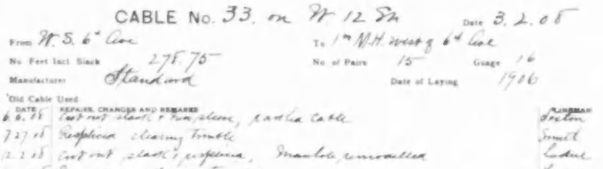
In New York, the regulations of the police department declare that a policeman is a policeman until he is dead or retired. He is subject to the call of the department at any hour of the day or night. For this reason, connected up to the borough switchboards are 43 exchange lease lines running to the homes of the administration and executive staffs. Should a great emergency arise, the executive staff would be hauled out of bed the first thing and told what to do and where to do it, while dressing. The administration staff would be similarly instructed.

In Manhattan 26 leased lines thus connect up the homes of the headquarters administration and executive staff; in the Bronx, four lines run to commanding officers' houses; in Brooklyn ten are connected up to the local switchboard; in Queens two, and in Richmond one. The headquarters switchboard at Manhattan can gather them all direct and deliver them simultaneously to the commissioner, who, as he is dressing, may give his orders to the chief inspectors and the whole executive staff at one time.

With the installation of the wireless system the Bureau of Electrical Service will be in perfect control of a zone several hundred miles in diameter around New York, including the ocean away beyond Sandy Hook; this latter through connection with incoming steamers. The recent wireless communications between the Chicago *Tribune* and the New York *Times* would even indicate that in time, by relays of course, the police of New York and Chicago will work wire to wire.

In beginning the work of renovating and regenerating the Bureau of Electrical Service the first step taken was the abandonment of the telegraph system and the substitution of the magneto telephone. Then the common battery and the magneto sections of the Manhattan swichboard were properly multiplied throughout so that the two sections which had practically formed two separate units were connected in one homogeneous equipment. Standard breast transmitters and head receivers were substituted for the antiquated swinging transmitters and hand receivers, enabling the operators to use both hands and operate while recording messages.

Certain sections were then equipped with an arrangement whereby general alarms can be sent to all the precincts in all the boroughs without interfering with the operation of the balance of the switchboard.


CABLE No. 33. on W. 12 St. Date 8.2.08

From W. S. 6th Ave. To 1st W.H. west of 6th Ave.

No. Feet last Stock 275.75 No. of Pairs 15 Gauge 16

Manufacturer Standard Date of Laying 1906

Old Cable Used

DATE	REPAIRS, CHANGES AND REMARKS	NUMBERMAN
6.8.08	Cut out stub, & run sleeve, put on Cable	Burton
7.27.08	Reported cleaning trouble	Small
12.2.08	Cut out stub, & supena, Manhole removed	Cadue
4.4.08	Run sleeve, cleaning trouble,	Cadue
12.16.08	Run 1" sleeve in 3rd joint cleaning trouble to 2nd Dist Court	Cadue
12.17.08	Run 2" sleeve in 3rd joint cleaning trouble to New York Hospital	Cadue

Cable Record Card Used in Police Telephone System.

Thus one operator plugs up half his Manhattan panel and a second does the same to the other half. The trunk lines are connected up by a third operator, and the whole is switched to an independent station, the lieutenant of the bureau, who proceeds to read the order to all at once. Previously this operation took about two hours. Now it requires about a minute to each borough, five in all.

All of the borough switchboards were overhauled and put in condition for periodic inspection and maintenance. Then a thorough inspection of the whole plant was begun and consumed a year of hard, incessant toil. It was discovered that the police signal system of Brooklyn was all but useless, and that the overhead wiring connected with it was in dangerous condition, chiefly on account of the wires running for miles on the Brooklyn "L" structure. They had been put there when steam was the motive power of the Brooklyn Rapid Transit. In the electrification of the road, high tension power lines had been run in close proximity to them and no one realized it.

Lack of care and maintenance for years had practically ruined the underground cables in Manhattan Borough. Some of them had lain in the muck at the bottom of manholes, walked on, jumped on, jammed and broken in a dozen ways, since 1880 and 1894. That they were working at all was a marvel. After they had been excavated sleeves were found to be

smashed beyond repair in many cases and the conductors sometimes bare of insulation.

There were no maps or records to guide in the location of the cables. There never had been an inspection, as such, for no one had any accurate knowledge of the location of the cables. The condition was not peculiar to Manhattan. It was prevalent everywhere in the city.

It was discovered through the inspection that the Interborough subway tunnel construction had damaged the Brooklyn cable. A suit was brought against the contractor and damages were collected. The damage required the laying of 2,536 feet of new cable aggregating a total of twenty miles of conductor. The old cable under the Harlem river was worn out, it was found. A new one was laid. The congestion of police business in Queens was found to be so great as to render that part of the system useless. As many as five precincts had been connected to one single overhead line. Eighty-three miles of additional overhead construction was installed and each precinct was connected to borough headquarters, and from there direct connection were run to the local hospitals; establishing for the first time a quick ambulance service. Incidentally, in making these changes, nine exchange lines costing $306 annually were eliminated.

The wiring in Manhattan was found to be just as bad. Inspection districts, precinct squads, hospitals, public institutions and courts were jumbled together on the lines, in innumerable cases being bridged on the same pair of wires. There was no means of preserving the essential secrecy of police operations. To relieve the congestion fifty-seven miles of conductor was leased from the telephone company, at a cost of $848, after it was found impossible to get the money from the city to straighten things out otherwise.

But the most important achievement of the reorganization of the bureau was the reduction of the entire plant to a card index. Every foot of the aerial, underground, and submarine plant was numbered by lengths and a card placed in a general index describing its actual condition, date of inspection, name of the inspector, repairs, etc. Maps were drawn of each borough, showing the exact location of each length of conductor, their branches, etc., and the numbers given drawn on each length. The same supervision was drawn up for the public trunk lines, the leased lines and the signal system. Then each station, instrument and switchboard was carded, with the details of age, type, connection repairs, and date of inspection and name of the man making the repairs.

One general index of conductors covered the whole plant. A second series of cards covered the aerial lines alone; a third the cable lines alone; a fourth the aerial lines by boroughs; a fifth the cables by boroughs. The same division was made of the stations and of the signal system by stations in boroughs, by instruments, by precincts and by switchboards.

Next in the system of cards, came the linemen's reports. These give minute details of repairs, supplies used, time taken, the locality of the part of the plant repaired, etc. These reports must be signed by the chief lineman and by the lineman. The records of the linemen's reports furnish data for the plant cards.

The next improvement was made in the care of supplies. Under the old regime, the supply department of the electrical bureau was the yellow dog of the department. Anyone who wanted anything from the supply room could go and get it. There were no accurate records kept. The amount of supplies consumed can be imagined.

It would be impossible for anyone but a lineman to get even a single roll of tape out of the supply room today. And before even he can get it he must present a requisition duly signed by the chief lineman as necessary and he must sign a receipt that he got it. In his report he must show how he used the supplies and what he did with the surplus and the return of his tools—which must be O. K.'d by the chief.

If, in the semi-annual inspection, it is found that no such job was done, both the lineman and the chief lineman go "on the carpet."

The data in these linemen's reports is transcribed on the card representing the part of the plant upon which the job was done, and the report itself is filed with the rest of the individual lineman's reports, under his own name. By picking up a month's reports from any one lineman, it can be seen just what he did, what supplies he used, how he used them and to gauge his expertness, speed and economy. Incidentally, the linemen's reports back-check the clerk in the supply room. For they must balance the stock in hand to a single brass screw.

The entire staff of the bureau, which as part of its work maintains the electric light and power of the department, consists of 107 men. Ten are civil service appointees. The remainder are regular members of the department, consisting of four lieutenants in charge of four switchboards, five lieutenants acting as chief operators, two sergeants acting as chief operators, one sergeant lineman, sixty-seven patrolmen linemen, and six linemen members of the force.

Subterranean Telephones

With the extension of the long-distance telephone system last summer as far west as Denver it is now possible to talk from Chicago to the bottom of some of the deepest mines in the Rockies.

Up at Idaho Springs, the center of the famous Clear Creek district, where the Newhouse tunnel has been run under the mountains for over three miles to connect a network of underground workings, there is a mine now down 2,500 feet. This mine, like many others, has its own telephone system, which is connected with the surface telephone lines. At the bottom of the deepest shaft, 2,500 feet under the mountain, there is now a telephone instrument, and standing there in the bowels of the earth one can call up Chicago.

Of course, telephoning in a mine isn't quite as easy as it is in a sound-proof telephone booth, especially if the great drills are working. Nevertheless, the miners get used to the racket and seem to have no trouble talking over the telephone, although to others it is almost impossible at the first few attempts.

They tried talking to Chicago last summer, when the arrival of the long-distance telephone caused almost as big a sensation in Colorado as did the first railroads. It is a common occurrence to talk with Denver, forty miles away, from some of the subterranean workings in the Rocky mountains.

The telephone instruments in the mines are specially constructed with a view of protecting their delicate parts from the dampness. At Idaho Springs there is a regular telephone system under one of the mountains where there are over a hundred mines, all of them tapped by an underground railway through which the telephone wires run.

How to Read Telephone Circuit Diagrams

By David S. Hulfish

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LESSON VII.

A NUMBER of unusual plug and jack symbols are shown in the group comprising Figs. 165 to 179. In Fig. 165 the tip and sleeve of the plug are shown in side view without insulation or handle, and in Fig. 167, tip, ring and sleeve are shown similarly; in both cases the conductors are taken to the respective parts, stopping on the part to which the conductor is led in the electrical circuit connections of the plug. Fig. 169 shows a plug symbol much used because it is so easy to draw. In this symbol, the conductors are stopped at the location of the parts of the plug to which they are supposed to connect, and the plug itself does not appear at all, except for the circle representing the plug tip. The association of the jack symbol with this very much simplified plug symbol helps to determine the symbol as a plug.

Figs. 171 and 172 show end or front view of the plug, the tip being drawn smaller to show the sleeve behind it. In Fig. 171, the sleeve is not taken all the way around, so that the conductor to the tip may not have to 'jump.' Fig. 173 is built upon the plan of Fig. 169, but shows the plug handle through which the conductors come to the tip and sleeve.

Fig. 174 attempts to indicate the flexible cord to which the plug is attached. The droop of the two parallel conductors leaving the back end of the plug simulates the droop of a cord fastened at both ends, and the two small circles at the left of the figure represent conductor junctions, or cord fastener terminals, where the cord is attached to the framework of the switchboard, and the cable wires are connected to the cord conductors.

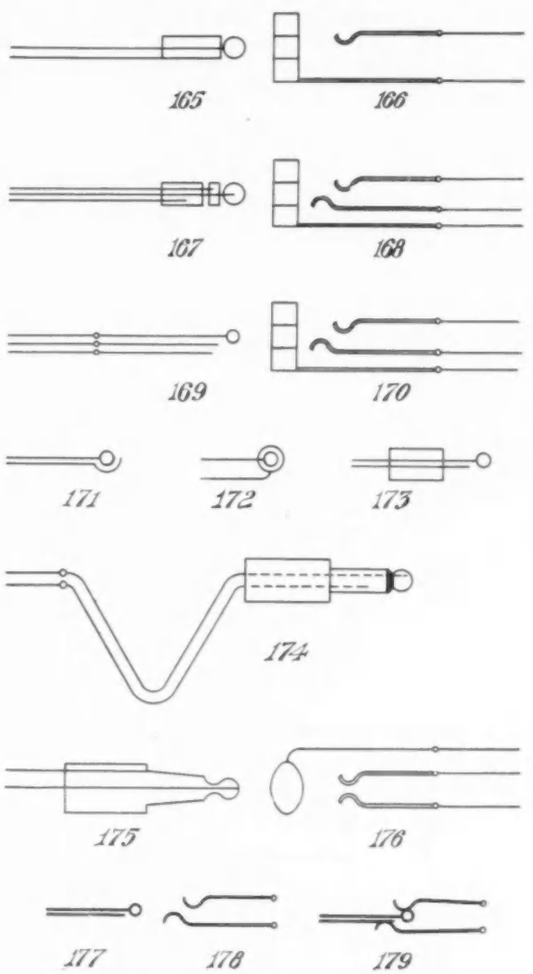
Figs. 175 and 176 are companion symbols for a plug and a jack taken from a German patent drawing. The two jack springs are of the same length and probably both connect with the tip of the plug. While the plug shows no insulation, yet it must be of two conductors insulated from each other, to co-operate properly with the jack, and there are two conductors leading from the plug.

Figs. 177 and 178 show associated plug and jack. The jack is noticeable in that only springs are shown, the body portion being omitted. In Fig. 179 the two symbols of Figs. 177 and 178 are shown in connection.

Another class of plug and jack symbol is the class representing plugs and jacks specialized for the requirements of some unusual or peculiar method of operation. Such specialization usually involves both the plug and the jack, although not necessarily so. Three instances will be studied.

Fig. 180 presents a sectional view of a specialized plug which would seem to operate with any single-conductor or so-called "one-way" jack, such as the jack of Fig. 152 or Fig. 154. In this plug, the part *n3* is isolated, except while the back end of the plug is pressed upon, as would be the case when the plug is being pushed into a jack, at which time the spring *n6* in the shaft of the plug would yield and the part *n4* would make contact electrically with the part *n3*. The screw part *n5* slides back by the same action, and breaks its connection from its conductor in the cord. The plug here shown is therefore a combined switchboard plug and automatic switch or perhaps automatic ringing key. It is well represented by the symbol of Fig. 181, although without the association of the mechanical drawing of Fig. 180 the symbol of Fig. 181, representing as it does simply an unusual specialization of an apparatus part, hardly would be intelligible.

A second case of specialization of apparatus parts in which the plug and the jack co-operate is shown in Figs. 182, 183, 184 and 185. In Fig. 182 a two-conductor plug of unusual conformation is shown fully inserted in a jack, the jack also being of somewhat unusual formation, since the springs of the jack are not in contact with each other, even though the plug is fully inserted. Furthermore, three types of plug are shown, all manifestly to be used with the same specialized jack, since but one jack is shown. The circuit diagram of Fig. 185 is explained by the drawings of the jack and plugs shown in connection with it. The jack of Fig. 182 closes its switching springs, while the plug is being inserted, hold-



Figs. 165 to 179. Unusual Plug and Jack Symbols.

ing them closed if the plug is stopped when nearly inserted, but not when the plug is fully inserted. When the plug of Fig. 184 is inserted in the jack at the right of Fig. 185, the long springs of the jack are spread to connect the telephone line to the operator's telephone, shown below the jack, in a symbol similar to that of Fig. 136, no flexible conductors being necessary in connection with the plug to effect this result, but the plug should be of insulating material. When the plug of Fig. 183 is inserted, the long spring is connected with the wire which

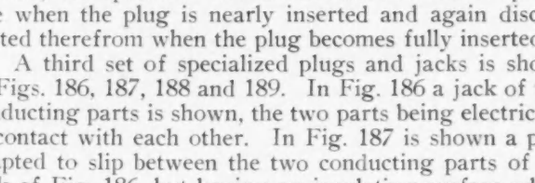


Fig. 180. Sectional View of Specialized Plug.

connects through the battery with the restoring coil of the drop when the plug is partly inserted, and the drop thus is restored, without affecting the operator's telephone circuit. This is true also when the plug is withdrawn, as well as when it is inserted. When the plug of Fig. 183 is used, the operator's set is connected to the telephone line when the plug is nearly inserted and again disconnected therefrom when the plug becomes fully inserted.

A third set of specialized plugs and jacks is shown in Figs. 186, 187, 188 and 189. In Fig. 186 a jack of two conducting parts is shown, the two parts being electrically in contact with each other. In Fig. 187 is shown a plug adapted to slip between the two conducting parts of the jack of Fig. 186, but having an insulating surface which would permit electrical contact with the upper spring of the jack, but not with the lower spring or anvil upon which the upper spring rests normally. In Fig. 188 is shown another plug, similar in shape, but without the insulating surface, whereby the plug when inserted in the jack of Fig. 186 would make connection electrically with both of the conducting parts thereof. These added details of the mechanism of the jacks and plugs enable the circuit diagram of Fig. 189 to be understood, the apparatus in that diagram being reduced to symbols. In Fig. 189, the substation telephone at the left controls as a line or calling signal the drop at the left of the figure, and the substation telephone at the right controls as a line signal the drop at the right of the figure. When the two lines are connected by the pair of plugs shown in the middle of the figure, it is evident that the conducting plug, namely, that similar to the plug of Fig. 188, permits the drop of the left-hand line to remain in, connecting with the line conduction during the connection,

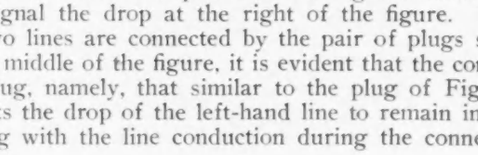


Fig. 181. Symbol of Special Plug.

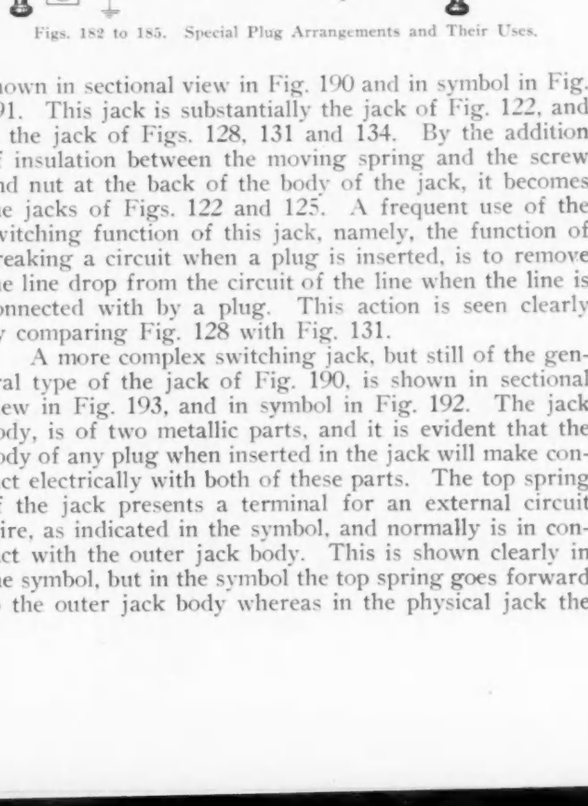
and thereby to remain upon the connection as a means for receiving a clearing signal, while the plug at the right, namely, that one similar to the plug of Fig. 187, disconnects the drop of the line at the right of the figure, not only removing the useless apparatus from connection with the circuit, since but one clearing drop is needed, but also permitting the ringing key of the pair of plugs to be operated to ring upon the line at the right without affecting the drop of that line.

When drawings of circuits involving specialized apparatus parts, such as the circuits of Figs. 185 and 189, are met, the auxiliary drawings, such as those of Figs. 182, 183, 184, 186, 187 and 188, usually will be found accompanying or will be accessible on inquiry.

In addition to the function of connecting with the conducting parts of the plugs, jacks as a general class of apparatus have another and important function, that of switching electric circuits independently of the circuit connections made between the jack and the plug inserted into it.

While the switching of circuits by jack springs and contacts within the jack is objectionable for the reason that the contacts never are reliable, the cheapness of accomplishing a switch within the jack by the insertion of a plug as compared with the cost of switching the same circuit by other means, such as a relay, will cause the switching jack to remain in the art as a detail frequently met in the switchboard and in the telephone circuit diagram.

By "switching jack" is meant a jack which switches or modifies a circuit other than any circuits of which the plug conductors form a part. The simplest type is

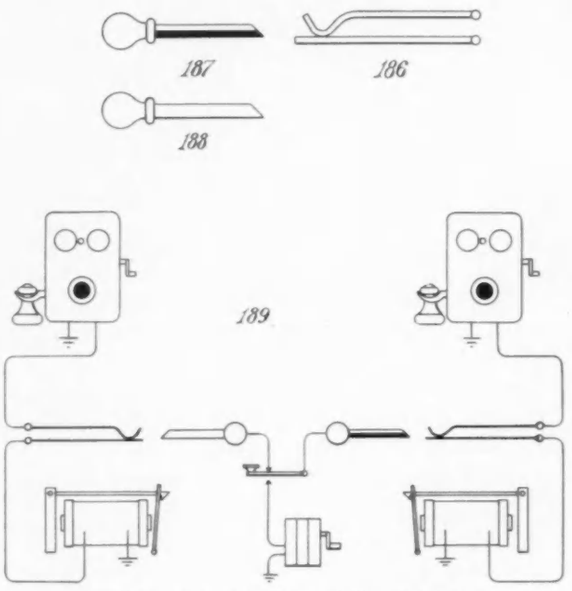


Figs. 182 to 185. Special Plug Arrangements and Their Uses.

shown in sectional view in Fig. 190 and in symbol in Fig. 191. This jack is substantially the jack of Fig. 122, and is the jack of Figs. 128, 131 and 134. By the addition of insulation between the moving spring and the screw and nut at the back of the body of the jack, it becomes the jacks of Figs. 122 and 125. A frequent use of the switching function of this jack, namely, the function of breaking a circuit when a plug is inserted, is to remove the line drop from the circuit of the line when the line is connected with by a plug. This action is seen clearly by comparing Fig. 128 with Fig. 131.

A more complex switching jack, but still of the general type of the jack of Fig. 190, is shown in sectional view in Fig. 193, and in symbol in Fig. 192. The jack body, is of two metallic parts, and it is evident that the body of any plug when inserted in the jack will make contact electrically with both of these parts. The top spring of the jack presents a terminal for an external circuit wire, as indicated in the symbol, and normally is in contact with the outer jack body. This is shown clearly in the symbol, but in the symbol the top spring goes forward to the outer jack body whereas in the physical jack the

outer body part goes back to the spring; thus does the symbol ignore the mechanical construction of parts, the requirement as an electrical symbol being only that it shows the electrical relations of the circuit forming parts. Again, in the symbol the inner jack body is represented



Figs. 186 to 189. Types of Plug Switches.

by the lower line passing to the right and apparently offering a terminal for the connection of an external wire, as the jack of Fig. 193 does offer it, but the moving spring which is to engage the plug tip is brought out to a terminal also and is connected by a short jumper conductor *a* to the body terminal. This conductor *a* does not exist as a wire in the jack, but is the direct contact of

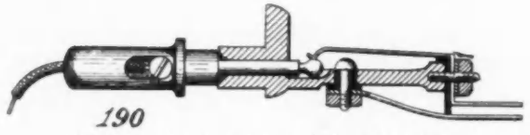


Fig. 190. Sectional View of Switching Jack.

the moving spring in its vertical portion at the back end, where it lies against the back end of the cast body of the jack. Again, the contact anvil of the jack passes downward through the body of the jack and then to the right in Fig. 193, whereas in the symbol of Fig. 192 it passes to the right before reaching the body of the jack as represented. In three instances, the mechanics of the jack

Figs. 191 and 192. Switching Jack Symbols.

is not followed in the symbol, but in every detail the electrical circuit features of the jack are represented in the symbol, even to the fact that the tip of the plug must make contact with the moving spring of the jack before the top spring is lifted from the outer body part.

In Fig. 194, a symbol is presented representing a jack in which the body of the plug makes contact with two conductors, one of which is represented as the body of the jack and the other as a spring located so near the body part of the symbol that the shaft of the plug probably connects with both the body of the jack and its long spring. This might be checked by measuring the length of the conducting shaft of the plug, but in details of measurements in symbols the draftsman is likely to be unreliable. If the jack of Fig. 194 is associated in the drawing with a two-conductor plug, then the long spring

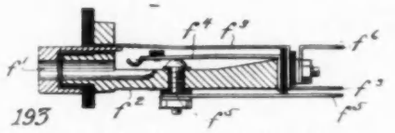
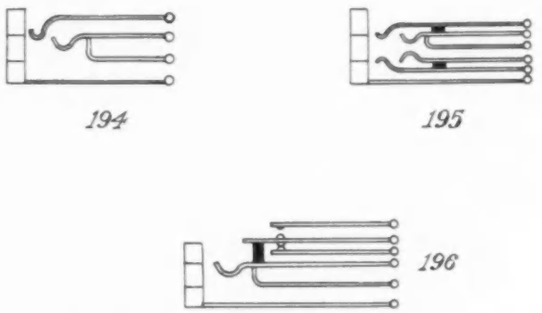


Fig. 193. Type of Switching Jack.

probably makes contact with the shaft, but if with a three-conductor plug, then probably the long spring makes contact with the ring of the plug. The conditions which the circuit is to fulfill will help to determine, and should decide definitely.

In Fig. 195 is presented a symbol for a jack having the feature of a temporary or transient contact. As the tip of the plug passes through the body of the jack, it connects with the two long springs of the jack, connecting with both of them and therefore connecting them to each other. As the tip passes further, it engages the two short springs of the jack, and, pressing them apart, also presses apart the two long springs, so that the long springs are



Figs. 194 to 196. Diagrams of Switching Jacks.

lifted and the connection just made is broken. The reverse action occurs in the removal of the plug.

In all of the jacks and circuits thus far discussed, the circuits switched have had to do in some degree with the plug inserted. In Fig. 196 is presented a symbol for a jack of the type of Fig. 191, but with an electrical switch added which is controlled by the plug, but is electrically entirely independent and separate from the circuits of the plug. Such jacks are common. The operation may be understood without detailed description.

(To be continued.)

Consul-General G. Bie Ravndel, in the Daily Consular Reports, sends from Beirut the information that telephones are to be introduced into the Turkish Empire and operated by the Government on the same plan as the mail and telegraph services. It is believed that sooner or later the Government on this point will yield to private enterprise.

The Selfridge Branch Exchange

The action of H. S. Selfridge, Chicago's erstwhile merchant, in establishing an American style department store in London, has furnished material for many a comment on American enterprise. According to A. C. Greening in the *National Telephone Journal,* the most popular item of the many displayed in Messrs. Selfridge's new stores in Oxford street, is undoubtedly the National Telephone Company's switchboard upon the third floor.

A bold innovation was instituted by the firm when it allotted a position for this right out in the open store, in the very center of the handsome building just completed. A rail serves to separate the operators from the public, and the novel sight of a telephone switchboard operated in the open, attracted at all times a crowd of onlookers standing six to eight deep throughout each day of the inaugural week. So great was the pressure upon the opening day that the rail and its supports were thrown down, and it became necessary to build a barricade of heavy carpet rolls standing upon end, round the switchboard, thereby permitting an adequate view, while preserving the necessary facilities for handling calls. Many onlookers were noted as having stood through periods varying from thirty minutes to one hour, altogether fascinated by telephone operating, any comments they felt impelled to make being made in subdued whispers. This unique method of bringing the public face to face with a little known section of their work provoked considerable interest in the members of the company's staff present.

The installation comprises three 1-position multiple type private branch exchange switchboards with twenty junctions and some 150 stations, mostly fitted with coin-collecting boxes. The restaurant is equipped with 54 jacks, in any one of which the plug of a pay-station telephone can be readily inserted. The whole scheme indicates in an extremely practical way what an important field for development lies in the direction of shopping by telephone and telephoning by shopping. To gauge the public appreciation of counter pay stations it is only necessary to shake the coin boxes at Selfridge's.

The Farmer's Telephone

The telephone might justly be classed with the time and labor-saving machinery of the farm. Before its introduction, practically all farm work that involved the cooperation of neighbors called for extra work in the way of notifying. Especially was this true if conditions arose necessitating a change of plans. Butchering, threshing, haymaking, fruit gathering—these and numerous other occasions required a considerable sacrifice of time and effort, where with the telephone a few moments' time is sufficient. The "friend on the wall," as one woman styled her telephone, runs errands better than a boy and far cheaper than the hired man. It would be hard to estimate the time really saved the farmer by this means. A fairly good idea, however, of the time-saving value of the telephone may be gained from the fact that the farming community that has once been awakened to its usefulness never goes back to the unsatisfactory and time-losing backwoods methods.

Then, too, there is the added feature of the farmer being able to discuss in person all matters relative to his work. Sending word is quite often an unsatisfactory method and is never as good as a personal talk. "If you want a thing well done, you must do it yourself" was the conclusion of Miles Standish in regard to courtship and courting is not the only instance where the adage applies.

The telephone is not only a time saver, but a money saver. With it the old "hit or miss" method of marketing farm products is replaced by business-like operations. The "prices dropped several points from yesterday's" argument does not catch the farmer who is in a position to watch the markets closely, as well as make his sales, by telephone. Prices from different dealers are readily obtained and a sale made before he leaves home. The choice of selling at a sacrifice or hauling back from market never comes to him. The telephone places the buyer and seller on equal footing—the only condition which absolutely insures square dealing.

Health precautions practically demand that the farmer's home contain a telephone. Sudden illness oftimes brings a crisis where a man would gladly give a hundred times the cost of a telephone could he get in instant communication with a physician. To the man living on a farm, isolated from his friends and miles from a doctor's office, an unwarned need of the latter's aid is not to be computed in dollars and cents. The city has long recognized its need of the ambulance and the emergency hospital; the country is wisely taking advantage of the time and life-saving element of the telephone.

Another feature that helps explain the popularity of the telephone in the farming districts is the broadened social advantages it affords. Few realize the important place the telephone holds in the social system. Formerly the farmer's social circle was confined too much of the time to the members of his own immediate family; now it is limited only to the number of his acquaintances who possess telephones. Friends, relatives, business acquaintances, both near and far—in city or country—all are in speaking distance. Social gatherings are planned, and visits are arranged for, in addition to the many social chats held through the telephone. No wonder that the farmer's sons and daughters are becoming more in favor of remaining on the farm since the advantages there are becoming nearly as great as in the city.

Telephone Systems in Big Buildings

Nothing better illustrates and emphasizes the vastness of the telephone system of Greater New York and its complexity than a few figures on the "vertical" telephone plants, so called, in some of the largest of the "skyscrapers." In the Singer building, for instance, there are two hundred and thirty miles of telephone wire, and the ultimate number of telephone instruments therein is thirteen hundred; the Broad-Exchange has two hundred and fifty miles of wire and sixteen hundred telephones; the City-Investment building carries four hundred and fifty miles of wire and eighteen hundred telephones; when the installation has been completed in the Metropolitan Life there will be six hundred and eighty miles of wire and about two thousand instruments; and the Hudson Terminal building will carry seven hundred and fifty miles of telephone wire and more than three thousand instruments. In all, these five New York buildings carry two thousand three hundred and sixty miles of telephone wire and very close to ten thousand telephones. There are scores of sizable and well-known cities in the United States the telephone system in any one of which does not include so many miles of wire or so many instruments as are in use in the Broad-Exchange building in New York.

Some Questions Answered

By J. C. Kelsey

[This department is at the command of our readers. Questions relating to all branches of telephony—technical, financial, ethical, or otherwise—are invited, and will be answered in the order received. Names of inquirers will not be used unless desired.—*Editors.*]

How would you classify farm telephone service—business or residence?—J. H. P., Nebraska.

This reminds me of a dispute over the doctor's telephone, as to whether it is a business or residence service.

If he has no other office except in his house, it is a business telephone. If he has a down-town office for day practice, and has a telephone there, he should get residence rates.

The farmer has like conditions. He really transacts all of his business in the city except what he might do over his telephone.

The farm rate is usually a little higher than your dollar residence town rate, and lower than your business rate. So he usually asks for equal privileges with the town residence when he has only a right to have a business telephone rate.

The farm telephone question is a big one. We all know the disposition of the farmer. He works desperately hard and is inclined to think that the man in town, working all day behind the counter, is getting all the good things in life.

My father ran a big harness shop in one of the best agricultural districts in the world. He worked hard with hand and foot and brain for twenty-five years. He raised a family comfortably as small town economy would permit. He finally sold out the business, having $5,000 more than he had in 1882. He actually made $200 a year above a living—a single disaster would have ruined him. Yet every man in the county thought him rich and abused him accordingly.

In 1882 the best farm in the county could be bought quickly for $5,000; $30 an acre was a high price. The farmer of 1897 sold his farm for $24,000, and then was taken with chills because he could have gotten more if he had waited.

The farmer now has automobiles and other luxuries, but he wants a $1 telephone. He does not care whether the harness dealer or grocer pays $2 a month at his place of business; he wants his place of business to class with the grocer's residence, because the grocer is rich and can pay $3 easily.

The farmer has his troubles and is looking out for his best interests. The telephone company has expense and troubles, too, and has depreciation instead of appreciation. In fact, I believe the farmer today represents the only appreciating property in our country. You may be sure that the farm is a place of business, but I would like to see you try to collect a business rate.

* * *

If a metallic circuit, sixty miles long, was constructed from west to east, placing transpositions every quarter of a mile, left-over-right, for a distance of fifty miles, and the other five miles was constructed from east to west transposing every quarter of a mile, left-over-right, giving us, in going over line from west to east, fifty-five miles left-over-right and five miles right-over-left; would said line be commercial as a long distance telephone line? If so, would it be better if all transpositions were alike—either left-over-right, or right-over-left?—G. H. M., Missouri.

It would be better if all your transpositions were from left to right, or right to left, for sake of uniformity.

If you have such a line transposed at half-mile intervals from left to right for fifty-five miles and from right to left for the remaining five miles, you can easily prove whether it affects you one way or the other, by installing a repeating coil at the point of change.

The quarter mile transpositions, regardless of whether left to right or right to left, should locally take care of all inductive effects and all such charges would be neutralized by pairing alternate half-mile spans. Possibly there would be cumulative charges left which would not be neutralized except on a basis of 11 to 1. Yet I doubt if there would be enough to affect the commercial use of the line—unless, of course, you were paralleled by a trolley line for the full sixty miles. There might be some disturbance in that case. Yet from an external disturbing wire standpoint, your line should not be affected by the five-mile right to left transpositions.

The greatest chance for trouble would be when your pole line had numerous other metallic circuits upon it. If system were not followed out, your linemen would be likely to make numbers of pairs alike.

However, I can see no electrical reason why your line would not be thoroughly quiet for commercial work. Local neutralization of charges would take place. The character of the charge, or preferably the quantity of the induced charge, would depend upon the distance from the disturbing wire. If you alternately put each half mile nearer to the disturbing wire, you would get neutralization.

This matter has been greatly discussed, and as far as I know, the only justification is for sake of uniformity—and uniformity alone.

* * *

I enclose a clipping from one of the Jackson, Mississippi, papers, showing a page advertisement of the Cumberland company, calling the attention of Jackson people to various large independent telephone exchanges, virtuously trying to save the people from loss by showing extravagant capitalization. They show 6 per cent of gross capitalization, and 8 per cent of capitalization for maintenance and operation. What I want to know is, what has capital account got to do with cost of maintenance and operation?—H. N. P., Mississippi.

Actual cost of operation has nothing whatever to do with capitalization. The cost of operating a telephone is well known, and has bearing only on cost of labor, material and other items of expense. The clipping shows the cost of operating a Keystone telephone at $56.14. Of this amount six per cent of $401, or $24.06, is credited to interest, and eight per cent is given to maintenance, or $32.08.

This claim takes the belt for imbecility. The writer of that juicy advertisement must be the relative of a man who, in the early days, jumped out from the bushes and fired two charges of buckshot into the backs of fathers, mothers and children. This man was called a "bushwhacker." In other words, the writer of this page in the Jackson paper is "bushwhacking" the truth.

The Keystone Telephone Company of Philadelphia

operates a telephone nicely for less than $20 a year. I can assure you that it does not depend upon its capitalization, either. This company further sets aside $4 in cash for a renewal reserve fund, and I will present the reader with a new suit of clothes if he will show me where a Bell company sets aside a like amount in cash for depreciation.

The Keystone pays five per cent on $160 bonds per telephone, making $8. This totals $32 a year, and the company earns over $36 a year to pay it. This leaves $130,000 a year to pay six per cent on $2,000,000 of preferred stock.

You can buy its bonds at $92.50 each. They pay five per cent. They are handled and guaranteed by the strongest investment house in New York. You can take these bonds or leave them. No false pretenses have been published yet. I would rather have a Keystone bond than any Bell security I know of. I wish I could leave my family enough of them. They would never want and would never have to worry.

The Keystone preferred stock is cumulative, but has never paid a dividend, even though it has been earned right along. A $50 par share of preferred stock is quoted at $42 and you can not buy very many, either. The common stock, $50 par, is quoted at $17 per share, and still none expects a dividend. The dear public does not own this stock. I wish I had a thousand or more shares. Some day, should the Bell companies cease dividends, the Keystone people will pay theirs and prove my "bush-whacking" theory.

If you want to have optimistic reports, or hear songs of joy and gladness, consult a minor stockholder of the Western Electric Company. If you want to hear further joyous testimony, I will refer you to the minor stockholders holding stock in the Bell companies operating in Kansas, Missouri, Iowa, Illinois, Indiana and Ohio, the very best states in our Union. There is need of Mr. Publicity-man learning that there is a glass house in front of his stone-throwing, and only "him who is without sin" can cast the first stone.

When I think of the corner the Bell company has upon all good things, I get blue. Then when I see somewhere the old chestnut that the "Orr Telephone Company, at Buffalo, has failed," I smile through my tears.

Once there was a small bank in my home county which failed on account of the speed of the cashier. This happened years ago, and $30,000 disappeared into the realms of gayety. Strange to say, no one as yet has advanced this as the innocent cause of the panic of 1907. In China they hang officials and directors of failed banks. Had this been a league rule here, the executions would litter our land.

But you can count the real independent telephone failures upon the fingers of your brawny fist. More money was lost in the Stensland bank failure of Chicago, or in the Booth fish fiasco, or the Great Western railroad, by minor stockholders, than in all the independent telephone interests put together.

Talking about their boasted perfection of financing and safety of stockholders, let me ask if any Bell company can beat the record of the Citizens' Telephone Company, or the Union Telephone Company, both of Michigan; all common stock paying regular dividends—no bonds and no debts. Some day you will agree with me that the greatest telephone man today is E. B. Fisher, of Grand Rapids. He knows more in one hour about the telephone business than I do in a week, and others, too.

If there is any sense or brain anywhere, a policy of silence would be maintained. When a Western Union Telegraph Company manager finds that you are patronizing the Postal, he writes you a nice letter and promises attention to your services. They do not get out and point out each other's weak spots. It's hard on the business. It is hard on a good business and is bound to hurt it. "Silence is golden, speech is silver." It is a shame to try to kill a good business. Old hen tactics are too inefficient for a business reaching into hundred millions annually.

* * *

In figuring ratio of operation, what items are considered? When one sees that one company shows 50 per cent, others 55 and some as high as 80 per cent, it is plain that unlike accounting methods are used.—B. F. H., Kansas.

The average independent company with 2,000 magneto telephones, with town subscribers, farm telephones, usual local toll lines, with connection with the leading city, has a gross earning of $18 per station and a cost of between $9 and $10 per year. The operating ratio is between fifty and fifty-five per cent.

The average independent company with a sprinkling of exchanges, both common battery and magneto, with its own toll lines and with connection to a large city terminal, averages a gross earning of $26 per year, and station expenses run between $13 and $14 per year, accordingly ranging between fifty and fifty-five per cent.

The individual large city companies average $30 to $36 per yearly station earning, and the expense runs from $15 to $19 per station. Here again, the range is between fifty and fifty-five per cent.

The gross earning item includes all station earnings belonging to the company. Technically, "net station earnings" should be the proper expression.

Commission and all switching charges should be deducted from the gross earning.

Operating expenses should include all items of operation, maintenance, taxes and insurance. Commissions are not operating expenses. They are simply deductions from the gross earning. They have no place in expense items. Therefore, net station earnings of $18 per year and expenses of $9 per year make fifty per cent.

Depreciation of $3 per station in such a plant is a factor of expense, but it comes outside of the ratio.

As far as stockholders are concerned, the application of dividends is not dependent upon fifty per cent of net station earnings, but dependent upon $18 divided by $9 plus $3, or 66⅔ per cent, leaving 33⅓ per cent applicable to dividends.

The second condiiton of $26 net station earnings with an expense between $13 and $14 per year, with $3.50 or $4 depreciation, makes the percentage applicable to dividends of $26 divided by $13.50 plus $3.50, or 65 per cent, leaving 35 per cent of net station earnings for dividends.

Thhe third condition of $36 net station earnings and expense of $19 plus $4 reserves, leaves 36 per cent of net station earning for dividends.

This first condition leaves $6 per station for dividends, the second $8 and the third $13.

The first condition has an investment of $75 per station, and $6 represents an earning of eight per cent.

The second condition calls for an average investment of $120, and $8 represents an earning of seven per cent.

The third condition averages an investment of $200 or more and $13 represents six per cent earnings.

The only way we can account for the high earnings

and high cost of operation of the Bell companies is that all earnings are credited to telephones. Commissions and switching charges are in their expense account, as well as all other items. The 4½ per cent of gross earning charge must be in the expense column, as well as lots of construction accounts. Their operator forces are usually larger than independent forces of same condition, and they have more men on trouble. They have larger general office expense, and particularly much more legal expense. They have to fight commissions and councils, and have been enjoining cities from ousting them. This all costs money.

It reminds one of two households—one family has a moderate income, and they live comfortably, save money and have reasonable entertainment. In other words, they are happy and have credit with the butcher.

Across the street another family lives, who have a larger income. They live luxuriously, and automobiles honk at their front gate in the early hours of the morning. They have boxes at the theater and they dress accordingly. Their name is in the society column, and when the dressmaker and butcher see it, they swear softly.

Which has the better chance of ruin?

* * *

"Resolved, the Executive Committee of the Chicago Association of Commerce believes that one well managed, well regulated telephone exchange in Chicago, in lieu of the two separate exchanges now existing, is in the best interests of the city.

"It further believes that in the relationship between the city, the citizens and the Chicago Telephone Company, there should be fair dealing and good faith, and that such satisfactory relationship on such basis exists now, and will continue to exist, and the committee therefore heartily approves the grant of such request of said Illinois Tunnel Company."

I would like to know the particular brand of stimulant that prompted this beautiful Utopian dream.

The relationship between the city, the company and the citizen! Well, that is pretty. The three graces, that beautiful bevy of charming females, Faith, Hope and Charity, have lost their job. Three Cs—Company, Citizen and City—have been created and now sit in their time-honored place.

I can imagine that a group of opulent citizens, if properly guided, sitting in comfortable chairs, smoking big cigars and occasionally visited by a waiter with cut-glass ware, could conceive of even a ship canal directly from New York to San Francisco, or an alliance between the wolf, lamb and shepherd dog.

The company is the wolf, the city the shepherd dog and our dear citizen the lamb. How oft has this lamb been sheared—and how meek he is, and how his wrath waxeth hot after it is too late.

There is a Senegambian in the wood-pile. If you would scan the proceedings of the really excellent and necessary association, you would find that a prominent official of the Chicago Telephone Company is always among those present. This amiable and very effective gentleman sets all their poems and odes to music. He is their songster, and he is always there. Men do not sing, at least, short-haired American citizens can not sing a note, except when prompted by "Solo" or "Old Guggenheim," and then they are mellow enough even to love their neighbor as themselves.

Really, the Chicago Telephone Company deserves a medal for crafty work, and I trust that the able prompter of all this "bunk" will get a true reward. Personality is a grand thing.

The point advanced in the resolution is all bunk. Long distance service in and out of Chicago is awful. You can not understand a man talking from Indiana or Ohio or Minnesota to save your life. They expect the ordinary subscriber to get effective transmission service when their own office telephones are arranged with double receivers and special devices so that they can hear reasonably well.

The gentlemen of Chicago are not so wise as they think. There are two million people here, and half of them are literally starving to death, not for bread and water, but for hope of future. Because Chicago has too many people for what business they do, they drive it away. Even the Chicago river will not let the larger vessels come in. They go elsewhere.

Compared with New York, we are a struggling village, and when out of town for some time, I wonder what night the band plays in the park and if old man Johnson still runs the hotel.

If a new railroad were considering an entrance into Chicago and demanded great concessions, the same executive commtitee would demand that every facility be given.

Yet a telephone company—itself a transportation problem; it brings ideas and orders, and not bodies, to Chicago—is denied entrance to a city sadly in need of additional ideas and orders.

If St. Louis had ten railroads entering its terminal and Chicago had but one, it would be plain that St. Louis would be the better city. It would have a greater area of influence because it could ship to many points of the compass. It could deliver orders promptly. Do you suppose Chicago with one railroad could compete? Compare New York and Philadelphia.

The trouble with the executive committee is that they do not know. They are only prompted. The fact is that telephone competition is a deadly fact, and the spirit of '76 is not dead yet. A man in Illinois will call St. Louis over his telephone for an order before he will walk over to a pay-station and lose a half day trying to make some one in Chicago understand unintelligible sounds.

A long distance telephone is a railroad to all intents and purposes. It hauls ideas and it hauls orders—just what we all want. Why the brainy business men of Chicago can not see it—I will have to guess.

The association has made a foolish break, and some day will see the point, but too late to remedy it.

Chicago is but a village—Minneapolis and St. Paul, St. Louis, Des Moines, Kansas City, Omaha and all other points are taking local business away from it. The growth of these cities should cause alarm. They do not deal with Chicago. They deal with New York and old Philadelphia, just as we do.

Look at Philadelphia—a victim of the Pennsylvania railroad. If you want a berth to Chicago there, you are informed that New York has eleven of the twelve reserved. Some of the Pennsylvania trains do not even stop.

Surely in the relationship between the city (of Philaedlphia), the citizens and the monopolistic Pennsylvania Railroad there should be fair dealing and good faith, but there isn't.

"Spare the rod and spoil the child."

Telephones in safe deposit vaults have been installed by a New York bank for the convenience of patrons who wish to consult financial men without taking securities from the vaults.

S. G. McMeen on Telephone Switchboard Lamps

During a recent discussion on incandescent lamps by the members of the San Francisco Section, American Institute Electrical Engineers, Chairman A. H. Babcock asked a question about small lamps. S. G. McMeen replied with the following interesting dissertation on telephone lamps:

"The lamps to which Mr. Babcock refers are those which are associated with telephone lines and telephone cord circuits in the very widely used manual common battery switchboard system. They are interesting from the lamp point of view because they are very small, representing a special phase of lamp manufacture, and because the making of them is a large industry. Several millions of such lamps are in daily use.

"The problem which these lamps represent is not one for the illuminating engineer, but is more closely allied to the electric sign industry, as the lamps are used solely for signal purposes. The usual practice is to mount each such lamp behind a slightly opalescent lens. The dispersion of rays enables the signal to be a very pronounced and clearly defined one, though the lamp has a diameter of only about a quarter of an inch.

"In the earlier applications of these little lamps a great many troubles were experienced. They arose principally from the fact that, because the lamp is so small, the ratio between the space occupied by the filament and the total space exhausted made the getting of a sufficient vacuum rather hard. Another difficulty was the very low voltages on which the first lamps had to burn. These were usually four or eight volts, which made the filament rather short, and on account of the small current allowed the filament was very much more delicate than its support. Furthermore, the lamps are used for two purposes, the greater number of them being mounted with relation to the lines, as calling signals, and a smaller number being mounted with relation to the connecting cords, as supervisory signals. These latter lamps stand in a keyboard upon which the connecting plugs are dropped as they are taken out of service, in sockets in which the plugs run back when so dropped. The amount of jar so occurring in regular practice was sufficient to run the breakage of filaments in these keyboard lamps up to an excessive amount; and at one time in the early days, orders actually were issued to operators to restore plugs carefully by hand to their keyboard places on taking down a connection.

"To place so great a burden on operating as a mere result of using lamps not hardy enough was plainly a thing not to be permitted. The natural solution of the problem came about by improving the type of lamps manufactured and by changing the electrical conditions under which the system operated. Greater skill was gained in making the lamps; the processes of exhaustion were improved; the voltage was raised to about twenty-five, at the same time simplifying the whole scheme of circuits; and the lengthening of the filament gave it elasticity enough to decrease the breakage to a reasonable amount.

"Interesting experiences were gained during these efforts, and an amusing one occurs to me. The filaments of the little lamps were made by the cellulose process, filter paper being dissolved in a solution of a caustic alkali in water. This cellulose "syrup" was squirted into a rotating jar of alcohol, which dissolved the water and alkali and condensed the cellulose into a thread. The alcohol was recovered for further use by distillation, so as to leave the water and alkali behind. The process went on very nicely until the Federal Government stepped in to stop the running of an illicit still. A distiller's license had to be taken out before the manufacture could continue.

"Relative to lamps in general, as energy translating devices, I am reminded of an amusing situation which rearises each year in a certain university. Each of a considerable number of students is given a jar containing a known weight of water, together with an incandescent lamp, a source of current, a voltmeter, an ammeter, a thermometer, and a watch. He causes the lamp to burn while immersed in the water, and observes time, rise of temperature, current and potential.

"After repeated trials each student admits his inability to account for more than 96 or 97 per cent of the energy absorbed, and the expression on his face is a study when he discovers that what he is calling a loss of 3 or 4 per cent really has escaped the observation of his instruments because it was emitted as light."

The Seasoning of Cross-Arms

The United States forest service has issued data pertaining to the seasoning and testing of cross-arms for poles. There are used in the United States every year about 14,000,000 cross-arms for telephone and telegraph poles. Of these, perhaps one-fourth are now treated with preservatives to increase their durability, and there are at least five plants at New York; Norfolk, Va.; New Orleans and Slidell, La., and West Pascagoula, Miss., at which cross-arms are so treated. Because of their small size as compared with the strength required and the weakening effect of the holes for insulator pins, and their constant exposure to all kinds of weather, cross-arms should receive a thorough treatment. A good treatment with creosote will at least treble their durability.

A large portion of the supply of cross-arms comes from the South; they are sawed from the loblolly or old field pine, of which there is a large quantity. It is necessary so to pile the cross-arms that the air may circulate freely about them, and to protect them from rain and snow by a roof of loose boards. By laying 20 cross-arms in a tier, two cross-arms at each side and two in the middle set on edge and allowing a small space between each of the others, which are laid flat, favorable conditions for seasoning are established and no rotting will occur.

The cross-arms should be sorted in three classes, as sapwood, intermediate and heartwood, and treated in different runs. Cross-arms are treated in large horizontal cylinders varying from 90 feet to 180 feet in length and from 6 feet to 7 feet in diameter. In these the arms are run on skeleton trucks and the doors are then bolted air tight. Creosote is next run until the remaining space in the cylinder is filled. Pressure is sometimes then applied by pumps to force the preservative into the wood. In some instances before the preservative treatment the cross-arms are treated to a bath of living steam, followed by the drawing of a vacuum to remove moisture and secure rapid penetration of the wood by the preservative. It is the opinion of the forest service, however, that the bath in steam is not necessary or desirable if the arms are properly air seasoned.

Memorial Monument to the Telephone

By H. Percy Hokesmith

THE city of Brantford, in the province of Ontario, Canada, is known far and wide as the "Telephone City." It was here that Professor Alexander Graham Bell perfected his marvelous invention in the year 1874; and it is here that it is proposed to commemorate that important discovery in a permanent manner. Accordingly, in 1904, thirty years from the inception of the telephone, at a largely attended public meeting of citizens duly called for the purpose of considering the question of such a memorial, the Bell Telephone Memorial Association was organized for the purpose of marking the invention of the telephone in the city of Brantford, and perpetuating the memory of its inventor, Professor Alexander Graham Bell, through the purchase of the Bell homestead as a public property and the erection of a monument in the city of Brantford.

The Bell Memorial Monument.

To get an authoritative recognition of the fact that Brantford is the birthplace of the telephone, the chairman entered into communication with the inventor, now residing in Washington, who has furnished all the facts connected with the invention. He states that the telephone was invented in this city in the year 1874, and that, to use his own words, "The first transmission of speech over a real telegraph line was made in Brantford in the autumn of 1876, on the lines of the Dominion Telegraph Company. In one experiment speech was transmitted from Brantford to Mount Pleasant (a distance of about five miles), another from Brantford to Paris (a distance of seven miles), and a third from Brantford to my father's house, on Tutela Heights (a suburb of the city), where the results were witnessed by a large number of Brantford people." The proposal has received the warm approval of many eminent men, including that of his royal highness the Prince of Wales, who, with the Princess, visited Brantford in 1902, and who on that occasion was presented by the corporation with a fully equipped long-distance telephone, the presentation being made by the late Professor Alexander Melville Bell, father of the inventor.

It was proposed that the memorial take the form of a suitable monument to be erected within the limits of the city of Brantford, and the purchase of the old Bell homestead. The latter is situated on Tutela Heights, giving a commanding view of the city, and can be made an object of local interest to visitors. Brantford possesses features of great historic interest connected with the Six Nations and other Indian tribes, many of whom still reside on a large reservation near the city, and to the memory of whose great chief, Captain Joseph Brant (Thayendenaga) one of the most beautiful monuments in America has been erected in one of the city parks. The old Mohawk church, the oldest Protestant church building in Upper Canada, is situated here, the services of the Church of England being still held therein, the resident superintendent of the New England Institute being the officiating minister. A Soldiers' Monument has recently been erected to the memory of the Brantford boys who were killed in the Boer war.

The patrons of the memorial association include some very well-known names; and some of the correspondence which has developed is interesting in the extreme. Hon. George W. Ross says: "I had the pleasure, perhaps I should say the honor, of speaking through the first long-distance telephone invented by Professor Bell, from his residence in the city of Brantford to his father's residence at Tutela Heights. I think it was in 1874. The telephone was regarded then as the production of a clever inventor calculated to interest the curious and novelty-loving people, but no one dreamed of its possibilities for commercial purposes. I think you are doing no more than is eminently proper to place on record your appreciation of the invention and the inventor in his connection as a resident of your beautiful city."

Another View of the Bell Memorial.

Hon. James Wilson, Secretary of Agriculture, U. S. A., writes as follows: "I am well acquainted with Dr. Bell and am one of his admirers. I believe him to be one of the greatest scientists of the age, whose invention has done more to facilitate the spread of intelligence than that of any other man, living or dead. He is at this time absent from Washington, being at the University of Edinburgh.

where he is to receive an honorary degree. I am pleased to see the Canadians taking this step towards honoring him. If there is anything I can do to facilitate the movement to honor him I shall certainly be glad to do it."

From Admiral Dewey: "This project seems to me a very worthy one, and I gladly comply with your request that I permit the use of my name as one of the American patrons of the association."

John Joy Edson, Washington: "In Washington, where Mr. Bell has resided for many years, the highest possible value is placed on his services rendered to the world as the inventor of the telephone.

"Mr. Bell is esteemed, also, in Washington as a scholar and a great scientist and benefactor in many ways. Moreover, he is beloved by all in Washington who are fortunate in having enjoyed his personal acquaintance and who have been his guests."

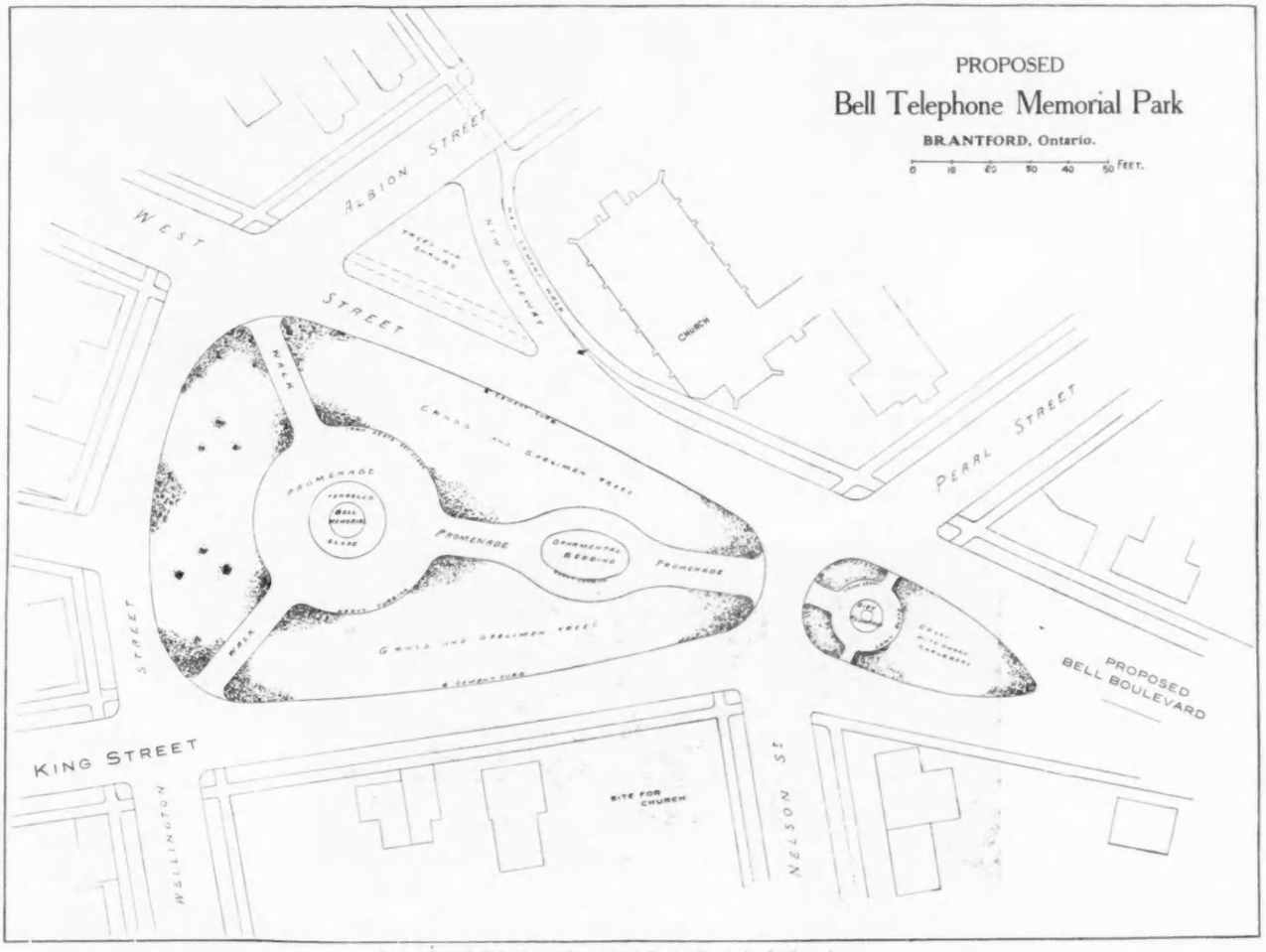
The Duke of Argyle, the Earl of Minto, Earl Grey, Sir W. Mortimer Clark, Hon. J. P. Whitney and Lord Strathcona and Mount Royal (who is honorary president of the association) also express their approbation of the movement.

The feeling of the citizens of Brantford was deeper than one of mere sympathy, as was evidenced by the splendid response to the soliciting of subscriptions, and the response from outside parties was also splendid, the finance committee securing the necessary sum to carry out their scheme.

There had, for some time previous to March 8, 1904, been a good deal of agitation, favoring some tangible testimonial to the recognized fact that Brantford was the home of the telephone. At that date Mr. W. F. Cockshutt, in his inaugural address as president of the board of trade, advocated that a fund be commenced at an early date with a view to erecting a suitable monument in honor of Professor Alexander Graham Bell, the inventor of the telephone. In dealing with this subject he said:

"Brantford is not only a progressive commercial and industrial center, but has also great historical interest attaching to it. Some of the important events in the history of the city have been perpetuated by monuments in a style that reflects credit on the artists, as well as on our citizens. The Brant memorial is probably the finest work of its kind in the Dominion, and the Soldiers' monument, recently erected, is a very imposing work of art; and now, at the risk of being criticised as a faddist, I am going to propose a third monument.

"Brantford has contributed much in the way of inventions, and in this respect may be said to be a world competitor. This city boasts of being the home and birthplace of one of the greatest inventions of modern times, an invention that is in universal use by all civilized nations, and one that plays a most important part in our



Plot of Bell Telephone Memorial Park, Brantford, Canada.

commercial and social relations. I refer to the telephone. We call ours the Telephone City. We should clinch our claim to this name while the inventor still lives. For this reason I propose that a fund should be started at an early date with a view to erecting a suitable monument in honor of the inventor, Professor Alexander Graham Bell. It may not be possible to acquire the necessary funds at once, but a fund should be started, and the movement would undoubtedly grow in such a way as would make it possible to erect a memorial that would be a lasting tribute in honor of the man who produced this great invention whilst a citizen of our own. In this way we should pay a just tribute to a man of great genius, and at the same time furnish an inspiration to many others."

The matter was taken up, and the council of the board of trade appointed a committee composed of Messrs. W. F. Cockshutt, Lloyd Harris, John Muir, G. H. Muirhead, Charles Duncan and George Hately, to look thoroughly into the scheme, and instructed it to report back to the board of trade at its next meeting. This was done and the committee went into it as thoroughly and in as painstaking a manner as time would permit. As a result of their investigations and inquiries they recommended to the board that a meeting of the citizens be called to deal with the matter, their report being adopted.

The movement was given a concrete foundation at a citizen's meeting, held in the council chamber on May 22, 1904. There was a good attendance present, and several speakers addressed the gathering on the proposal, which met with the unanimous approval of all present. Accordingly an association was formed, with the following officers: President, W. F. Cockshutt; vice president, Lloyd Harris; treasurer, John Muir; secretary, G. H. Muirhead; associate secretary, George Hately.

To this executive the special committee of the board of trade presented their report, which was unanimously adopted. The chairman, at the request of the committee, communicated with Professor Alexander Graham Bell, acquainting him with the movement then on foot. In reply Professor Bell gave his approval, and stated that he was highly honored by the suggestion.

Outside of preliminary work but little was accomplished until February 2, 1906, when the executive committee met in the office of Mr. George Hately, in the county courthouse, and adopted a resolution setting forth the object of the association, as outlined on the first page of this article, at a cost of $40,000; and a committee was a short time later appointed to carry out the latter part of the scheme by subscriptions and grants from governing bodies.

At the next meeting of the board of trade it was decided to invite Professor Bell to a banquet, and at the next meeting the association resolved to tender him a reception, both of which were splendid successes.

At the general meeting of the association held on March 3, 1906, it was decided to ask the legislative assembly to incorporate it, and a special act was passed, designating the name as the "Bell Memorial Association" and the objects as above stated.

A finance committee was appointed to the arduous task of raising funds by subscriptions, and by devoting considerable time, trouble and expense a goodly sum was raised, the sum of $40,930 now standing to the credit of the association. The manufacturers and local citizens contributed handsomely, and grants were made by various legislative and municipal bodies. The Dominion of Canada contributed $10,000, Ontario legislature $2,000, Quebec legislature $1,000, Saskatchewan legislature $1,000, city of Brantford $5,000, county of Brant $500, city of Toronto $500 and city of Quebec $100.

At a meeting held June 30, 1908, it was decided that a monument would be erected on the properties and gores bounded by Wellington, West and King streets, which would be acquired as a site for the proposed memorial. This work has steadily gone ahead, and the last transfer of property has been consummated.

In connection with the memorial, the site chosen is undoubtedly the best that could have been secured in the city, located as it is in the very heart of the residential part of the city, on a thoroughfare leading from the Grand Trunk station to the center of activity. The plans proposed by Mr. James Wilson, commissioner of parks, Toronto, will beautify this portion of the city and considerably enhance it as a residential section.

The work of selecting the design for the memorial monument has been finished. The members of the committee were: Byron E. Walker, Toronto; George C. Gibbons, K. C., London, chairman of the Canadian section of the waterways commission, and State Senator Davies, of New York. All were chosen because they are recognized authorities in art.

Nine models were submitted. The first choice was that of Walter H. Alward, of Toronto, who is the designer of the Baldwin-Lafontaine monument, Ottawa, and the Soldiers' monument, Toronto. The second choice was G. W. Hill, of Montreal, and the third A. E. Pausch, of Buffalo. These selections will be considered by the local directors of the memorial association who have final decision.

The dominant feature of the successful design is man discovering power to transmit sound through space. This is shown in large sculptured panel with three floating figures, representing three messengers—Knowledge, Joy and Sorrow.

At the sides are two heroic figures, representing humanity sounding and receiving messages. On the back are four pillars, at top of each are the emblems of the leading nations. Between these runs a line of telephone, and binding the whole is a line of the earth's curvature, expressing the world-wide use of the telephone.

To the left of the large panel is the portrait in relief of Dr. Alexander Graham Bell, the inventor of the telephone.

The cost of the memorial is $25,000.

New Local Association Formed

The Eastern Illinois Telephone Association, composed of telephone owners of Mattoon, Charleston, Decatur, Newton, Casey, Westfield, Kansas, Shelbyville, Tuscola, Arcola and other towns and cities in this territory, was organized recently at a meeting held at the Dole house, Mattoon, Illinois.

The object of the association is the general improvement of telephone service in eastern Illinois, and the members hope by having a permanent organization to receive a mutual benefit and to gain close co-operation between the various companies.

Officers of the association were elected as follows: President, C. W. Shimmel, Casey; vice-president, W. C. Lumpkin, Mattoon; secretary, Ray Hall, Westfield; executive committee, W. C. Lumpkin, Mattoon; Dr. Collins, Decatur; D. P. Moore, Olney.

A Booklet on Telephone Talk

The New York Telephone Company has issued a 16-page booklet entitled "Talking Over the Telephone," which it is distributing among its patrons. The nature of its contents is shown by the following selections:

TELEPHONING AS AN ART.

This happens daily in a large commercial house:

Assume that you are Mr. Jones. Last spring you became a customer of the house and talked several times over the telephone with its president, Mr. Smith. Then you went to Europe for three months. The first day back home it is surely astonishing, on calling up that house, to hear its telephone operator greet you by name, as though you had just been around the corner for five minutes.

"This is Mr. Jones, isn't it?" she says, pleasantly. "Do you want to talk with Mr. Smith again?"

That house has hundreds of customers. The young woman sitting in a quiet room by herself seldom sees any of them. The internal telephone system runs to thirty departments, each with its chief and his assistants, all with their particular customers, some calling daily, others perhaps once a month. But the operator keeps track of them all, and is seldom at a loss to know who's who.

Customers maintain that she has a remarkable memory. But really the secret is interest in her work, and attention to remembering people one by one, as they have come along, in five years' experience at the switchboard. She has made hundreds of friends for the house, though few of them have ever seen her, and her value to her employers need not be emphasized.

Skillful telephone talk is necessary nowadays, not merely in business, but in social life.

"To do any work well, one must be able to talk well," says a telephone engineer. "We should all be able to state a case by telephone so that people understand what to do next, and the reason. I have noticed many cases where one person called another in an absolutely friendly spirit, and the information or suggestion given was entirely unobjectionable. But the method of saying it was such as to produce lasting prejudice. There is an old proverb, 'One can tie knots with his tongue which he can not untie with his teeth.' This is particularly true of telephone talk."

Telephone talk need not be clever. But it ought to be courteous, and above all things *correct*.

Uncle Sam says that if every piece of mail bore the sender's name and address, he could abolish tomorrow the costly Dead Letter Office, which handles millions of pieces of misdirected mail yearly.

There is such a thing as the misdirected telephone message. All of us manage to send a few each year. Most of us would send fewer if everybody understood how telephone messages get astray, and service would run more smoothly for every one.

TELEPHONE COURTESY.

There are three parties to a telephone call:

1—Yourself.

2—The telephone company.

3—The person with whom you talk.

It is not sufficient that one or two of these do their work properly. The co-operation of all three is necessary.

In telephone operating, the human element must be considered. The public is human. Telephone operators are human. The hastily spoken word and its inflection conveys whatever impression each gets of the other. Under such coonditions, courtesy both on the part of the operating force and the public is like oil to machinery—necessary to prevent friction.

When you have called a wrong number, apologize. Practically, you have been caught driving up the wrong side of a street crowded with traffic.

When your private exchange operator or office boy is told to get Mr. Smith on the telephone, be ready to talk when Smith answers. Don't keep him waiting. Smith has been interrupted in his work, and the burden of courtesy is upon you.

Answer your own telephone promptly. Delay may compel the company's operator to report "Don't answer" to the person calling, and you may thus miss important information.

Speak slowly. Half the art of good telephoning lies in deliberate talk. This gives clearness and emphasis. Try it, and note how persons with whom you are talking respond.

Above all things, speak pleasantly. The person with whom you are talking can not see you. You must make your impression wholly through the tone of your voice and what you say.

Finally, when you telephone, devote yourself to telephoning. The attempt to carry on other tasks at the same time causes you to move away from the transmitter, and the person with whom you are talking will hear indistinctly, and may misunderstand.

The remainder of the book is devoted to a disquisition on telephone germs and an explanation of the company's various forms of service.

Wireless Telegraph Rates

Consul-General A. W. Thackara, of Berlin, is in receipt of a letter asking for certain information regarding wireless telegraphy in Europe, to which he replies, in the Daily Consular and Trade Reports:

"The international wireless telegraphy treaty of November 3, 1906, the supplementary agreement, the final protocol and the agreement for executing the provisions of the treaty have, up to the present time, been ratified by Germany, Belgium, Brazil, Bulgaria, Denmark, Spain, Norway, Holland, Roumania, Russia and Sweden. The treaty, the final protocol and the agreement for executing the provisions of the treaty have been ratified by Great Britain, Japan and Mexico, and recently the latter country has also ratified the supplementary agreement. Great Britain, in the ratification of the treaty, includes Canada, Australia, New Zealand, the Cape Colony, Natal, Transvaal, India and all the other British colonies and protectorates, with the exception of Newfoundland and the Orange River Colony. The British government, according to the provisions of paragraph 2 of the final protocol, has reserved the right to except individual wireless telegraph stations from the obligations of paragraph 3 of the principal treaty. This reservation also applies to India and the other British colonies and protectorates named above.

"As to the location of each station and their respective governments that are available for communications with all wireless systems, a list is now being prepared by the International Wireless Telegraph Bureau at Berne, but it has not yet appeared.

"The charges for wireless telegraph messages at the German coast stations are as follows:

"Besides the regular telegraph rates in Germany of 5 pfennigs (1.19 cents) a word, minimum price 50 pfennigs (11.9), there is a charge of 15 pfennigs (3.57 cents) a word, minimum 1.5 marks (35.7 cents), and if the message is sent to a steamer which can be reached from the coast station an additional toll of 35 pfennigs (8.33 cents) a word, minimum 3.5 marks (83.3 cents), is charged. These charges can be prepaid at any of the German telegraph offices.

"Until the international list of wireless telegraph stations which is to contain the charges for sending wireless messages is published the fee for coast stations outside of Germany, according to information obtained from the Gesellschaft fur Drahtlose Telegraphie of Berlin, has been fixed at 48 pfennigs (11.42 cents) a word, with a minimum of 4.8 marks ($1.14). If the fees at the said coast stations are in excess of those stated in the new list the difference will be returned to the senders when the new list goes into effect."

Application has been made to the Philadelphia Stock Exchange to list $232,587,000 capital stock of the American Telephone and Telegraph Company. This is the largest application ever made in the history of the Philadelphia exchange. The stock is already listed in both New York and Boston.

Who's Who in the Telephone Game

Facts and Fancies About a Man You Know or Ought to Know

NEARLY all of his business friends and associates call him K. B. Probably that is why his family, consisting of a wife and three daughters, and his social friends and other acquaintances call him something else. K. B. is significant, standing as a prefix to this particular individual's name. His father's mother's maiden name was Kempster. His mother's maiden name was Blanchard. That explains it.

Kempster Blanchard Miller is not so old as his whiskers and his works would indicate, for he was born in Boston, August 14, 1870. So, you see, he is still under 39. You never would have guessed it, would you?

Not so Old as His Whiskers and His Works Would Indicate.

His preparation for success was unusually thorough. From Boston, he was taken as a mere babe to a plantation in North Carolina—the land of pitch, tar and turpentine. He remained there, always with his parents until he was twelve.

Joseph Kempster Miller, his father—born in London in 1834—left the farm when K. B. was 12 and took a position in the Bureau of Printing at Washington, where he installed much of the machinery used in those days. This gave the son the benefit of the Washington High School, from which he graduated at the age of 19.

It is well to set down something of this father—a brilliant type of the highly cultured, courteous gentleman of the olden school. His trade was that of a mechanic, although his life led him into other things. As a craftsman he did some wonderful work with the limited facilities men had in those days. He learned his trade in Rochester. From Washington he accepted a place with E. P. Allis Co., Milwaukee, where he remained for many years. While he was engaged in this work, the son was mulling through a four years' course in mechanical engineering at Cornell, which he finished in 1893. During his vacations he was employed at the Thompson-Houston works at Lynn. In the Fall of 1893, following his graduation from Cornell, he entered the Patent Office at Washington, as Assistant Examiner. It is worth mentioning that the place came under civil service regulation and that Miller stood No. 1 in the long list of applicants.

It was a brief step from assistant examiner to chief of the electrical division. During 1894-96 Mr. Miller had charge of all telephone applications—the class of telephony, but the itch for practical work brought about his resignation, and he went into the Westinghouse shops to get it. But he didn't stay there very long before he was offered a place with the Western Telephone Construction Company—the pioneer among independent manufacturers.

K. B. Miller and his father were chums—that's why you can not talk about one without mentioning the other. The father had a leaning to books and he urged the son to write a book as one of the requirements to a professional career. The patent office emphasized the need of something of the kind and it was these things which resulted finally in Miller's American Telephone Practice—the bible of telephone literature. In 1898 Mr. Miller found time to write a telephone course of instruction for the American School of Correspondence. These two books have had an enormous sale and have had a wide influence upon the telephone business. The first volume, being the most comprehensive, is dedicated to the father, who is properly credited as being responsible for it.

In 1899 there came a telegram from Milo G. Kellogg, who was then at Harrisburg, Pa., asking Mr. Miller to meet him there. Mr. Kellogg was about to engage in the manufacture of telephones on his own account and he wanted an engineer and superintendent. Miller got both jobs under contract. The original Kellogg factory was in Highland Park, where the new engineer-superintendent had his first full capacity job. Side by side with his system of control of the works was a well-developed system of suggestion which extended to the humblest employee. K. B. Miller is a likeable fellow. He is never too busy to give you a minute or two. His patience is seldom ruffled and for grasping big, comprehensive work he has few equals. Most ambitious men deplore life's time restrictions—Miller doesn't. An active money-grubber has little opportunity to run around. Miller's present occupation keeps him on the jump from ocean to ocean, but he takes its pleasures and hops over the pitfalls. He neutralizes everything. You may find him at his office reading about the retirement of Dean Thomas Frederick Crane in the *Cornell Alumni News*, when a limited train is to start him on the way to New York within fifteen minutes. The prospective task is out of mind—the details of preparation have had their inning.

Mr. Miller contributed much to the Kellogg factory. A number of his inventions belong to that company. He has a few that are commercial sidelines, but they do not interfere with his present affairs.

In 1904, with Samuel G. McMeen, the firm of McMeen & Miller was established. It is a partnership with

nothing to mar the happiest relation that ever existed between friends. Kin could not hold stronger ties. Brotherly love is pushed into the background. These two men know each other and their work is handled without friction. Mr. Miller's largest undertaking was an examination of the New York city fire alarm system for the New York Board of Fire Underwriters. The report of his findings, besides the mass of detail, bordered upon the spectacular. His report was followed with a contract to design a new system. This assignment was even greater than the previous one, involving a mass of information, the result of months of study and execution. The report and its specifications and recommendations were adopted by the New York city council.

Ethics of the business—the bane of professions in general—precludes the advertisement to say more than "telephone engineer, patent solicitor, patent expert." But in spite of the eithics K. B. finds it convenient to hide himself in a private office, far removed from the main entrance. "Is Mr. Miller in?" That's the way they all say it in the outer office. "Is Mr. Miller in?"—just like that. But when they are ushered back through the little narrow passageway and get an audience with the big man—for he's a six-footer in the 200 class—its "Hello, K. B., how's things"? Oh, its all different back there, where you are in the presence of the squarest man who ever put out his hand in greeting.

Miller is a home lover, even though his club memberships suggest otherwise. He is enrolled with the Chicago Engineers' Club, the Union League, the Illinois Athletic, the Quadrangle, the Western Society of Engineers. In New York he is a member of the Engineers' Club and the American Institute. He was for some time chairman of the Chicago branch of the latter.

West Virginia Independent Convention

The West Virginia Independent Telephone Association held its fourth annual convention at Parkersburg, W. Va., May 27 and 28. The meeting was called to order by President Barnes, who delivered an address reviewing the important events of the past year.

Frank L. Beam, president of the Ohio association, gave an address on "Telephone Associations," in which he outlined the history and purposes of the independent associations.

A. C. Davis, secretary of the International Association, delivered an address on "Compulsory Connections," which brought considerable discussion. Other subjects treated were "Good Construction," by W. C. Handlan, and "Proper Rates for Rural Service," by A. H. Doudna.

The following resolution was adopted by the convention:

"Be it Resolved, That the Executive Committee be authorized and empowered to take whatever action is deemed by them necessary to create public sentiment against the proposed enactment of a compulsory connection law in this state, and to take any further action to combat, before the public and at the sessions of the legislature, any legislation such as the aforementioned, or anything of like character that is calculated to do injury to the best interests of the independent telephone companies in West Virginia."

Officers for the ensuing year were elected as follows: John A. Howard, president; R. M. Dalzell, secretary; A. C. Davis, treasurer; J. H. Wise, first vice-president; Leander Moore, second vice-president; E. K. Hertford, third vice-president; Hugh Amos, fourth vice-president; H. H. Henry fifth vice-president. The executive committee is composed of A. C. Davis, J. Walter Barnes and W. C. Handlan.

How Indians Use Telephones

The Indians are great on using the telephones; but they have little or no use for the local boards, their calls being over the long distance. They do not put in a call for the individual. They do not ask for White Eagle at Canton, or Flying Cloud at Darlington. The call is for "Any Cheyenne." The same is true as to the Arapahos, any member of the tribe serves.

To illustrate, an Indian puts in a call for any member of his tribe at Canton, Darlington, Colony, Lawton or any point. It is up to the manager to go out on the street and pick up an Indian. Any one will do, so he is of the tribe asked for. He is led to the telephone and the talk proceeds. The talk being in Indian langauge, no one knows what it is about.

If an Indian, say in Clinton, wants to reach one of his people, say forty miles from Canton, or any other given point, he calls for one of his tribesmen, tells him the message he desires delivered and it is his business to deliver it, even though it requires a night trip and in a storm.

A little Indian baby died near Clinton last year and its mother desired that her relatives attend the funeral services. They lived out on the prairie northwest from Canton. The telephone was used and a member of the tribe directed to deliver the message to the poor mother's relatives. It was delivered by a courier across the prairies and canyons and the relatives came in over the Orient next day.

Last summer, a call came to Clinton for a "Kiowa," that was a poser for the manager, Mr. Bayliss. However, he found upon inquiry among the Cheyennes that there was one who had lived among the Kiowas and spoke the dialect. He was led to the telephone and received the talk. What the Kiowa wanted to say, nobody knows.

Mexican Telephone

The financial report of the Mexican Telephone and Telegraph Company for the year ended Feb. 28, 1909, compares as follows (in Mexican currency):

	1909.	1908.
Rentals for year	$369,303	$369,908
Gross earnings	385,767	388,033
Gross expenses	204,331	209,367
Net earnings	181,438	178,665
Operating	148,575	153,446
Maintenance	55,756	55,920
Construction	161,020	92,989

Electric Railway Telephone Lines of Indiana

The Indiana Railroad Commission's annual report shows that 32 electric railroads operating in Indiana have constructed and equipped 2,968 miles of telephone wire for the use of dispatching trains and conducting the business of these roads. The smallest number of miles of wire operated by any one road is 18.26 miles and the largest number 959.22 miles. This total number of miles of telephone wire reported does not cover the whole number of miles used by traction roads operating in Indiana, about 10 roads having made no report on telephones.

Fighting Forest Fires by Telephone

By W. H. Radcliffe

ACCORDING to Dr. W. J. McGee, erosion expert, United States Department of Agriculture, the aggregate loss from forest fires in all parts of the country during the months of conflagration is close to one million dollars a day. Taking into consideration the loss of this timber for building purposes and fuel, the loss of its foliage for replenishing oxygen to the atmosphere and the arrested development of river streams which this great devastation of our forest entails—streams upon which we rely each year more largely for power, for soil preservation and for otherwise supplying the necessities of life—the seriousness of the situation assumes alarming proportions and places grave responsibilities upon those states, counties and towns which have not as yet done anything toward solving the problem of locating and fighting forest fires.

Further argument is unnecessary to show that the great loss suffered each year through forest fires is a serious hindrance to our national prosperity. That this loss could be largely prevented is proven by the successful efforts made during the past few years by the United States forest service. Only a comparatively small proportion of the forested area of the United States, estimated at one hundred and sixty-eight million acres, is under its control, and if all the forests are to be saved, states, counties, towns, corporations and private individuals must co-operate with it. Among the states which have taken active steps toward organizing forest fire-fighting departments are New Jersey, Pennsylvania and New York. New Jersey claims the distinction of being the most advanced in this respect, chiefly on account of its department being organized to look after all woodlands, irrespective of ownership. The origin of forest fires is always an interesting problem, and often a perplexing one. So far as information is obtainable forest fires are due to many and varied causes. In New York state, for example, where during the past year there were over 700 forest fires, the causes were reported as follows: Hunters, 103; campers, 27; fishermen, 18; clearing land, 19; incendiary, 48; berry pickers, 12; children, 6; burning building, 1; lightning, 9; blasting, 2; miscellaneous, 47; railroad locomotives, 85 serious fires and over 300 incipient ones which were extinguished without serious damage.

The appended table is taken from the New Jersey state records, and gives a summary of the forest fires occurring in that state during past years. It shows that although the number of such fires has considerably increased of late the area burned and the estimated damage done has greatly decreased, owing to the higher efficiency of its forest fire-fighting department.

It will be noted from this table and from the statistics previously given from New York state that railway locomotives are the most dangerous of the several causes responsible for starting forest fires. Efforts are now being made to have the railways co-operate with the forestry service in clearing each side of the track where the road passes through woodlands and instructing the track walkers and train crew to report to those in the employ of the United States forest service any fires which they themselves are unable to extinguish and to render assistance in fighting these fires whenever possible.

Forest Ranger Telephoning for Aid.

The regular and volunteer forces employed for fire fighting in the national forests number about 200,000. Of these a large percentage are employees of great lumber companies and railroad systems, stockmen, stock herders and every holder of use-permits in the national forests, with all dependents—all of them ready to serve at a moment's notice from the United States forest supervisors.

During the summer months, when destruction by fire is greatest, 1,351 rangers and guards are employed in the United States forest service to patrol the national forests. Each of these men is required to protect an area of 121,506 acres; an area much too large to be thoroughly covered by one man, but governed by the appropriation of funds. The rangers, mounted on horseback and provided with portable telephone sets, traverse the national forests, and whenever a dangerous fire is sighted notify the forest officers of the fire over the telephone lines. As soon as fire is thus reported fire fighters are rushed to the burning region.

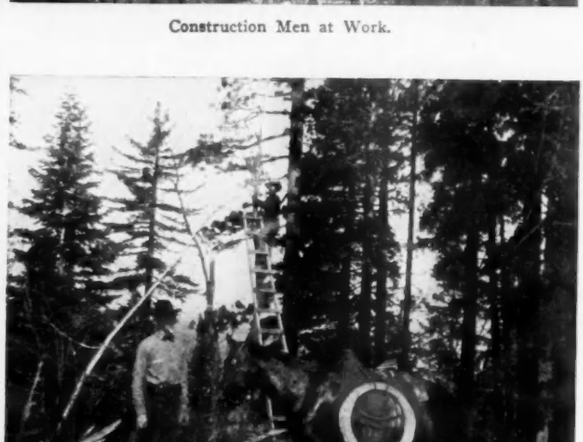
During the fiscal year ending June 30, 1908, thirty-five hundred miles of telephone lines were constructed in the national forests, so that fires starting there could be promptly reported and extinguished. Besides this, 160 miles of road and 3,300 miles of trail were built for use by the rangers and to facilitate the massing of large forces of men at advantageous fire-fighting points. This action on the part of the United States forest service was timely and valuable, in view of the almost unprecedented conflagrations which since then have threatened to destroy much of the valuable woodland of the United States. The illustration shows a United States forest

supervisor reporting a fire by means of a portable telephone set in the Shoshone national forest, which lies in the northwestern part of Wyoming. In this case the telephone set was hung on a tree and short-wire connections were made with the line wire and ground. A call was thus sent to Cody, Wyoming, about forty miles distant, and help was received more than a day sooner than if the message had been carried by man. This fire started an hour or two before it was discovered and burned over 1,500 acres of heavy timber land before it was under control, but the loss was small compared with what it would have been if a telephone had not been used.

The telephone line consists of single galvanized wire supported on glass insulators. The insulators are mounted on a substantial pole line, and lightning rods at every tenth pole or thereabouts provide suitable ground connections for portable telephone sets, the other terminal of the seats being temporarily connected with the line wire.

All of the telephone sets now in use in the United States forest service for fighting forest fires are of a type specially designed and constructed for the purpose. Each is provided with a strap to facilitate handling. It contains a buzzer, hand generator, switch, receiver cord, one dry battery, induction coil, a transmitter and a receiver. The transmitter is fastened inside of the case and the receiver and the other projecting parts

Construction Men at Work.



Running a Tree Line.

are mounted so that they are not liable to be caught by branches, and thus handicap the carrier. The compactness of the set makes it easy to handle.

The set is connected in circuit, as previously explained, by joining one of its terminals to a leader brought down from a telephone line, and its remaining terminal is connected to ground.

Supervisors of the national forests in southern California are bending every effort toward the completion of trails and firebreaks planned for construction during the past winter. This hustle is accounted for by the fact that the dry season is fast approaching and the danger from forest fires is becoming imminent.

On the Angeles forest one of the most urgent needs in connection with the system of government fire patrol has been that of telephonic communication with interior sections of the mountains not covered by commercial lines. To meet this need the service has, during the last winter, constructed forty-five miles of private telephone line.

In the construction of this telephone line practically all the work was done by the local rangers, assisted by a telephone expert from the San Francisco office. Although designed primarily for use in connection with fire patrol, the telephones will be available for use by the local settlers when that use will not interfere with the interests of the government.

SUMMARY OF FOREST FIRES FROM NEW JERSEY STATE RECORDS.

	Number of Fires.	Acres Burned.	Acres per Fire.	Estimated Damage.	Damage per Fire.	Causes					
						Locomotives.	Burning Brush	Smokers.	Incendiary.	Miscellaneous.	Unknown
1872	..	100,000	....	$1,000,000	.....	..	..	..	..	..	..
1880	54	71,074	1,316	252,240	$ 4,671	28	7	..	7	12	..
1885	..	128,000	....	1,128,000	.....	..	..	..	..	..	..
1895	49	66,120	1,349	600,000	12,245	24	6	4	4	5	6
1902	65	98,850	1,520	169,323	2,605	21	22	4	2	12	4
1907	167	11,525	69	11,647	70	60	7	1	10	19	70

Railway Men Discuss Telephone

The Association of Railway Telegraph Superintendents met in convention June 24. Train dispatching by telephone was the main subject discussed. It appeared that many railroads in the United States and Canada are ready to adopt the telephone system. A number of interesting papers were read.

National Buys West Virginia Western

The National Telephone Company, controlling lines in New York, Pennsylvania, Ohio, West Virginia and Maryland, has acquired control of the West Virginia Western Company, of Parkersburg, W. Va., operating 6,000 telephones in West Virginia and Ohio. The consideration is said to be $600,000.

Items of Legal Interest

By Ralph M. Loring

TELEPHONE CHARGES.

When the Corporation Commission upon making an order prescribing the rates which a telephone company may charge for services on its exchange fails to make a finding of facts and to certify the same to the Supreme Court on appeal from its order, the Supreme Court may under said section of the Constitution remand the case to the commission, with directions to find the facts upon which the commission bases its order, and to certify the same to the court, before the appeal is finally decided.—*Pioneer Telephone & Telegraph Company v. Westenhaver. Supreme Court of Oklahoma.* 99 *Pacific* 1019.

MAINTENANCE OF TELEPHONE SYSTEM BY INDIVIDUAL.

An individual may own and operate a telephone system and may, as authorized by statute, set and maintain his poles and other fixtures along and across public highways.—*State v. Cadwallader. Supreme Court of Indiana* 87 *Northeastern* 644.

STATUTORY REGULATION OF TELEPHONE SYSTEM.

While an individual owning and operating a telephone system is subject to the obligations imposed on telephone corporations by Burns' Ann. St. 1908, Section 5802, with respect to equal facilities and advantages and freedom from discrimination, yet neither an individual nor a corporation is bound, in the absence of contract or voluntary undertaking or statutory regulation, to furnish the patrons of another the use of its or his exchange and lines, since each exchange conducted by an individual or a corporation is separate and distinct from all others with respect to the conduct of its business and in its relation to the public.—*State v. Cadwallader. Supreme Court of Indiana.* 87 *Northeastern* 644.

DAMAGES FOR FAILURE TO ANSWER CALL.

Where plaintiff was compelled to get up at midnight and go out to search for a doctor for his sick wife, because a telephone company negligently failed to answer his telephone call, the loss of time and the extra effort, etc., caused by defendant's negligence, would constitute annoyance, for which actual damages could be recovered.—*Cumberland Telephone & Telegraph Company* v. *Jackson. Supreme Court of Mississippi.* 48 *Southern* 614.

RAILROAD REQUIRED TO MAINTAIN TELEPHONE.

With only one railroad station in a town having one telephone exchange, and an inland town about six miles distant with about 300 population having a telephone exchange, said town receiving all of its freight by the way of said station and a telephone installed and maintained in said station, connected with both exchanges, it appearing that the installing and maintaining of such telephone would be to the convenience of the patrons of said railroad station, the order of the Corporation Commission requiring such telephone to be installed and maintained in said station will not be disturbed in this court.—*Atchison, Topeka & Santa Fe Railway Company* v. *State. Supreme Court of Oklahoma.* 100 *Pacific* 11.

DISCRIMINATION BY EXCHANGE.

Where an operator of a telephone system furnished connected immediate service to separate exchanges and their patrons, but denied such service to another exchange and its patrons of the same class, the operator discriminated against the latter in violation of the common law and of Burns' Ann. St. 1908, Section 5802, requiring telephone companies to supply applicants impartially.—*State* v. *Cadwallader. Supreme Court of Indiana.* 87 *Northeastern* 644.

REEL IN STREET NOT A NUISANCE.

A reel three feet long and four feet in diameter, with lead pipe coiled upon it, and placed next the sidewalk in the line of telephone poles, for the present purpose of stringing the pipe on the poles to inclose telephone wires, and leaving ample room for the travel along the street, is not shown to be an unsuitable appliance or in a needless place, and so is not a nuisance, though so placed it is likely to frighten well-broken horses carefully driven.—*Simonds* v. *Maine Telephone & Telegraph Company. Supreme Judicial Court of Maine.* 72 *Atlantic* 175.

AGREEMENT BY LANDOWNERS TO MAINTAIN POLES.

A parol agreement by several adjoining landowners to erect and maintain telephone poles on their respective lands, and to contribute equally to the expense of stringing wires thereon, and of operating a telephone line, does not create an easement, but is merely a parol license, and is revocable by any one of such owners, although in reliance thereon the poles have been erected and the line constructed.—*Yeager* v. *Tuning. Supreme Court of Ohio.* 86 *Northeastern* 657.

REFUSAL OF FREE SERVICE.

Where, the State Railroad Commission having abolished free county telephone service and fixed the charges therefor, a telephone company sent a general circular to the managers of all of its exchanges to discontinue free county service and to be governed by the rules of the commission, and the manager of an exchange followed the direction without knowing that the franchise of the telephone company in that city required it to extend free county service to its patrons, but as soon as the conflict was called to his attention took the matter up with the home office, after which free county service was properly established, and it did not appear that the operator, in refusing a patron free county service, was otherwise than courteous, the telephone company cannot be held liable for punitive damages for such refusal.—*Cumberland Telephone & Telegraph Company* v. *Paine. Supreme Court of Mississippi.* 48 *Southern* 229.

EXCLUSIVE TELEPHONE SERVICE IN HOTEL.

A hotel company voluntarily contracted with a telephone company to install an exchange in its hotel. The telephone company was to defray the expense of equipment, and have the exclusive exchange rights in the hotel for ten years. It did not appear that the rates charged

were unreasonable, nor that the service was unsatisfactory, nor that any other competing hotel nor the public generally had complained of any unjust discrimination because of the contract, nor had any public official questioned the validity of the contract, but, so far as appeared, only the parties to the contract were affected by it. *Held,* that the hotel company could not have the contract annulled as granting an exclusive privilege in violation of public policy after it had been partially performed and avoid liability for further performance and obligations already incurred thereunder, especially where it appeared that its object was to permit a rival telephone company to install an exchange and enjoy an exclusive privilege in the hotel.—*Central New York Telephone & Telegraph Company* v. *Averill. Supreme Court of New York.* 114 *N. Y. Supp.* 99.

ABSENCE OF GUARD WIRES.

In an action for the death of a servant by contact between telephone wires and a trolley wire over which they were strung, it was error to permit the jury to base their verdict on the absence of a guard or protection between the wires, where there was no evidence that such a guard was feasible.—*Conklin* v. *Central New York Telephone & Telegraph Company. Supreme Court of New York.* 114 *N. Y. Supp.* 190.

EVIDENCE AS TO VALUE OF TREES.

In proceedings to condemn a right of way over land for a telephone line, evidence as to the value of trees destroyed in its construction is admissible for the jury's consideration in determining the injury or diminution in value to the land, though the value of the trees cannot be awarded to the owner as a distinct and independent injury to the land.—*Long Distance Telephone & Telegraph Company.* v. *Schmidt. Supreme Court of Alabama.* 47 *Southern* 731.

CONSENT OF MUNICIPALITY UNDER SOUTH DAKOTA STATUTE.

Rev. Civ. Code S. D. Section 554 (Acts 1885, p. 208, c. 141, Section 3), provides that "there is hereby granted to the owners of any telegraph or telephone lines operated in the state the right of way over lands and real property belonging to the state and the right to use public grounds, streets, alleys and highways in this state subject to the control of the proper municipal authorities as to what grounds, streets, alleys or highways said lines shall run over or across and the place the poles to support the wires are located." Const. S. D., Article 10, Section 3 provides that "no * * * telephone line shall be constructed within the limits of any village, town or city without the consent of its local authorities." A city ordinance provided that "the right is hereby granted to * * * his succesors or assigns to place, construct and maintain upon and through the streets and alleys" of the city a telephone line, "subject, however, to all conditions and stipulations herein set forth." It required the grantee to accept the ordinance in writing and to construct the line within four months, which he did. It also provided: "Section 10. The term of this franchise shall be for ten years from and after its passage." The grantee operated the telephone system for six years, and then conveyed the same to complainant, which was a corporation organized under the laws of the state and by its charter authorized to purchase, lease, construct, and operate telephone lines and exchanges. *Held,* that by the ordinance, and its acquiescence in the construction of the line by its grantee, the city consented to such construction within the meaning of the constitutional provision; that the right of complainant to maintain and operate the line was not derived from the city but from the state, and was not affected by the limitation in Section 10 of the ordinance.—*Dakota Central Telephone Company* v. *City of Huron. Circuit Court, D. So. Dakota.* 165 *Federal* 226.

USE OF PUBLIC ROAD.

The construction of a telephone line upon a public county road or highway in the state of Georgia, with the approval of the county authorities in charge of such road or highway, which line is used in the transmission of messages between various points, is not an additional burden or servitude upon such public road, and does not exceed the uses to which the easement in the public can be put by the approval of such county authorities, and an abutting landowner has not the legal right to present such use.—*Southern Bell Telephone & Telegraph Company* v. *Nalley. Circuit Court N. D. Georgia.* 165 *Federal* 263.

TELEPHONE RENT.

A telephone subscriber is presumed to know that his telephone is liable to get out of order, and, if it is situated in the country, that some time may elapse before it can be repaired; and such subscriber is only entitled to a deduction from his bill subsequent to the expiration of a reasonable time after the company had notice of the trouble and failed to repair it.—*Buffalo County Telephone Company* v. *Turner. Supreme Court of Nebraska.* 118 *Northwestern* 1064.

TELEPHONE LINE ON RIGHT OF WAY.

A railroad company which had acquired, by condemnation proceedings, the right to cross the right of way and depot grounds of plaintiff railroad company, authorized defendant telephone company to erect poles in the right of way so acquired and to string wires thereon for the service of the railroad company and the general public. In consideration of the grant, defendant agreed to permit the consenting company to attach telegraph wires to defendant's poles for use in the operation of the railroad. The wires did not interfere with the operation of plaintiff's railroad, and the only disturbance of the soil of the common easement of the two railroads was the digging of holes for the erection of the poles. *Held,* that the erection of the poles and wires did not constitute an additional servitude on plaintiff's railroad property.—*St. Louis, Iron Mountain & Southern Railway Company* v. *Cape Girardeau Bell Telephone Company. St. Louis Court of Appeals, Missouri.* 114 *Southwestern* 586.

TELEPHONE AND POWER WIRES.

A telephone company and an electric light and power company, maintaining in the streets of a city wires for their respective purposes must use, for the protection of persons and property, reasonable care in the construction and maintenance of the wires and other appliances, and both must use reasonable care to prevent contact of the highly charged electric light and power wires and the telephone wires in such a way as to divert the current to the telephone wires.—*Mize* v. *Rocky Mountain Bell Telephone Company,* Supreme Court of Montana, 100 Pacific 971.

PREVENTING CONTACT BETWEEN DIFFERENT WIRES.

A telephone company running its wires across a lot without permission from the owner owes to one rightfully on the lot engaged under employment in erecting a building thereon the duty to use ordinary care to prevent injury by the transmission through its wires of electricity escaping from other wires.—*Southwestern Telegraph & Telephone Company* v. *Bruce*, Supreme Court of Arkansas, 117 Southwestern 564.

TAXATION—GROSS EARNINGS.

Money collected by a telephone company from its patrons and subscribers for other telephone companies, with which it has traffic arrangements, is not a part of its gross earnings.—*State* v. *Northwestern Telephone Exchange Company*, Supreme Court of Minnesota, 120 Northwestern 534.

TAXATION OF TELEPHONE COMPANIES.

A proportionate part of the earnings of the property of telephone companies within this state, resulting from its use in interstate commerce, constitutes a part of its "gross earnings," upon which it must pay the 3 per cent tax provided for by chapter 314, p. 581, Gen. Laws, 1897.—*State* v. *Northwestern Telephone Company*, Supreme Court of Minnesota, 120 Northwestern 534.

STATE REGULATION OF RATES.

No part of the depreciation fund accumulated by a telephone company from its receipts can be added to the capital, upon which the company is entitled to a fair return from rates established by a state commission.—*Railroad Commission of Louisiana* v. *Cumberland Telephone & Telegraph Company*, Supreme Court of the United States, 29 Sup. Ct. Rep. 357.

Some Undeveloped Uses of Accounts

By Charles G. Du Bois*

IN ANY comparison of uniform data it is not difficult to locate the weakest or the strongest point in any one respect. But it is difficult to collect and correctly interpret statistics which will show how weak or how strong a company may be, taking into account the relative importance of all the various data bearing on the subject. It is easy to show by statistics that a certain matter should be corrected, but it is painstaking work to prove that it can be corrected without unfavorable reactions on anything else.

In the development of comparative telephone statistics three essentials stand out, viz.: the development of units, the determination of standards and the correlation of data, and these essentials apply not only to company data but also to statistics of departmental and individual efficiency.

When the gross amounts to be compared vary considerably, as they frequently do, and when comparisons of percentages are not sufficient for the purpose, it is necessary to reduce the data to some common denominator. The most intelligible way of doing this is by the use of some unit such as the station, or the message, or the mile of wire. I do not believe any one unit will serve all purposes in considering telephone statistics. Nor has anyone yet gone far enough to say authoritatively what units are most appropriate for all the different classes of such data.

The simplest unit by which to measure investment, revenue and expense, and the unit generally used, is the subscribers' station. Under the conditions that first existed, when each subscriber had one set of instruments and was connected with the central office exchange by one circuit, this was a fair unit; but conditions have changed. Each subscriber does not have one station; some have an extension; some are party lines—two, four and more on a circuit; some are grouped in private branch exchanges and trunked over one or more circuits; some have separate answering jacks at the central office for each station, some have one answering jack for several stations.

All these different conditions have their effect. This is at once apparent with respect to the revenue, for different rates are made for private branch exchanges, and for party lines, and for extensions, as distinguished from the simple and original form of individual service. The value of a station, as a unit for universal use, is accordingly impaired. It is still a fairly safe average for certain uses because simple conditions still exist in many cases, but it must not be too confidently relied upon.

The average per station for repairs of aerial lines may be low in one company and high in another, but the low company may have many private branch exchanges and party lines. Probably a better method would be to compare the percentages of repairs on aerial lines to the cost of the aerial lines in various companies, or to compare the repairs per mile of aerial wires.

But the mile of wire is clearly not a fair unit for all purposes, as, for instance, operating wages, which depend chiefly on the number of calls, though even here we have to consider the effect of irregular calls. Various schemes of so-called weighted units are proposed, meaning thereby different relative values for different classes of transactions when the total expenditure for all cannot be subdivided. The fairness of the weighted unit depends directly on the accuracy with which these different relative values are calculated, and unfortunately from the nature of the case they are usually more or less arbitrary.

These few comments will perhaps indicate the possibilities and opportunities before us for the development of fair units.

Having established and defined the unit for any particular class of data we have then to say what figure is the standard on one side of which a result is satisfactory and on the other side of which a result is unsatisfactory. To illustrate: suppose we conclude that the mile of wire is the most suitable unit for comparing the cost of repairs to toll lines, one with another. Suppose we find that the actual figures on this vary from $1 per mile per year to $3 per mile per year, but that we find a number of cases, not known to

*Abstract of paper read before the New York Telephone Society.

have exceptional conditions, are around $1.30. The practical way to make use of this data is to let everyone responsible for the repair of toll lines know that there is a standard $1.30 which (with all reasonable allowances for exceptional cases) he is not expected to exceed, while bettering it will be to his credit.

Can anyone doubt the practical good that would result from the use of only this one statistical standard? Nor is this a theoretical measure. It is the basis of modern scientific piece work. It is the principle followed in many companies as to operating loads. It is equally, though perhaps not so easily, applicable to other operating and maintenance work, to construction and to routine clerical work.

The third essential toward getting the full use of telephone statistics is the correlation of different kinds of data. This affords an unlimited opportunity for the exercise of ingenuity, enterprise and sound reasoning. Here we pass out of the field of simple arithmetical comparisons and have to consider what data has a bearing on the telephone business and of this what we will select as likely to throw light on any particular phase of the business. It is evident that if we start at random we shall soon be lost in a maze of figures. We must then fix our minds on some particular purpose, some specific question and gather around that whatever seems to bear on it. Then we must study and judge the bearing of each part of this data on every other part. This is not peculiarly the work of an accountant or statistician. It is exactly what every clear-headed administrator who bases his actions on knowledge and reason tries to do. This is perhaps worth an illustration. From one source of information the administrator knows the rate of net increase in stations for a certain period and from other statements he learns the rate at which net investment in plant is increasing. His first thought then might be that if plant investment has in any period increased less rapidly than stations the general situation justifies certain recommendations for extensions. But on reflection some other question arises as to that general situation.

Suppose the net increase in stations was three per cent for a certain period and the increase in plant investment was two per cent. Before the administrator can be satisfied that this is as good a showing as it appears to be he should know:

1. That the stations added were of average revenue-producing character or better.

2. That the increased plant investment was of such a character that it will not unduly increase maintenance.

3. That the expense of canvassing for those new stations was not such as to absorb the net earnings from them for an unreasonable period.

All this and perhaps much else is only to satisfy the administrator that his business is set upon safe lines; that he is not fooling himself by a few statistics not properly correlated with other and, of course, in making his decisions as to specific extension he must have all the significant facts pertaining to each.

A scheme of accounts is only a method for getting data as to financial transactions. From the early days of business enterprises the proprietor has tried to learn the results of his ventures. Through all the changes and progress in commercial conditions and methods the keynote of accounting has been to tell the proprietor the effect of his transactions on his wealth.

As the proprietor got further and further away from the detail of his transactions his agents began to take his place and the success of his business came to depend chiefly on his judgment or luck in selecting his principal agents. Finally we come to the modern corporation having thousands of proprietors (or stockholders) and thousands of agents (or employees), the latter because of their great number and the increasing specialization of each one's work necessarily grouped under heads and sub-heads constituting what we call an organization. In all this time until recently the direct purpose of the scheme of accounts has been to show the results of the business in terms of money, and only indirectly, if at all, the relative value to the business of the individual.

Now it is practically established that in this modern industrial scheme the accounts should and can serve both purposes. Only to a limited extent has this principle been yet developed in telephone accounts.

There are many difficulties, it is true, in working this out, but progress is now being made in developing the general scheme of accounts so as show at least the operations of the main departments of organization. This should be on such a basis that the accounts of one geographical district can be compared with those of another for the corresponding kinds of work, and thus some definite tests made of relative efficiency of men responsible for similar work in different places.

As an illustration, suppose the organization includes a department charged only with the duty of making collections of subscribers' accounts and having seven geographical districts. The accounting scheme could easily show the wages and other expenses pertaining to this particular work in each district, not forgetting that rent, postage, stationery, etc., are part of the expenses. The regular problem for the head of all this collection work is how to decrease expense and maintain or improve the standard of service, for his record is bound to be compared with those of other men having similar responsibility elsewhere. He starts by comparing his expense in each district and he finds at once that district B is the highest, but he knows that this district has the largest number of subscribers. Here begins his need for a unit and his correlation of data. Suppose he takes the subscriber as his first unit. He gets the number of subscribers in each district and, applying the cost per subscriber, finds it highest in district C. But on further thought he questions if district C may not be making collections more promptly than the others, so he gets the figures of the month's collections as compared with the bills rendered. This data indicates that district C is the best of the seven and district D the worst. Perhaps he finds, also, that district D not only is losing interest by delay in collections but that its ultimate loss on uncollectibles is larger, although its expense per subscriber is low. The question is now as to the relation between loss on uncollected (including loss of interest on slow collections) and the expense of collections. By experience and study he establishes, or there is established for him, a tentative standard for expense and for quality of service, measured in this case by promptness and completeness of collections. Then he may first require all the districts to improve their service up to the standard, and in so doing finds the expenses of some districts increased, but at last he has them all at the standard of service and can begin to talk expenses. District E,

in charge of Smith we will say, has now the highest expense and the burden of proof is right on him.

Smith is, perhaps, new at the work, but ambitious and energetic. He analyzes the daily duties of his collectors and finds they each make so many calls, travel so many miles, collect so many dollars and so on, and he finds some do better than others. By sundry methods of his own he applies to the individuals under him the same kind of tests that are being applied to him. He explains to them the necessity of getting about more rapidly, of making favorable impressions, and shows them how it can be done. He finds, say, five who greatly increase their efficiency while, say, three do not. But the five best men are now doing the work which eight were formerly doing. The three poorest have to go. Smith thus makes a record which, kept up, makes him and his methods the standard of efficiency in that work. His collectors are sought for other districts or other cities. Smith's promotion is as certain as a natural law.

I know, of course, that this only describes a general process you have all seen applied to some extent. I do not seek to draw from it any great moral lesson, but I venture the opinion that this simple principle of gauging men's efficiency by their records of performance is the chief cause for the superior efficiency of some corporations as compared with others, and of some departments as compared with others.

Now there are many of these records that the official scheme of accounts does not provide for. Some of them it should. Others are of such a character that their use is transitory. Still others are such that they should be published so that those who will may use them. Many of them are so small in themselves that general managers may never hear of them. But their effect on the individual is important from his standpoint and the aggregate of them may measure the difference between success and failure of the business.

One of the interesting features of this subject is that where officials have failed of their full duty in this direction the men down the line have frequently gone at it themselves. This is not altogether strange, because the man on the job can see some things more clearly than the official.

It has happened, for instance, that a man who had charge of construction and maintenance work in a small city, thinking his men were not exercising good judgment in the use of materials, kept a record of the material drawn by each individual, compared it with the work done and investigated discrepancies, thereby greatly reducing the quantity of material used. Again, a certain division plant superintendent started a record showing the mileage of each toll line in his district, the number of troubles per mile of wire and the total expense per section, thus showing the relative efficiency of his section linemen.

Other illustrations of this tendency have come to my attention, some of them like these two, of considerable importance from a general point of view, because they immediately suggest the question whether such schemes could not be standardized and applied elsewhere.

The correct and final answer to that question can only be worked out through a comprehensive consideration of the entire routine processes of the telephone business. Often such extraneous methods grow up because other proper methods are missing or inadequate. Again, unless such satistical records have a uniform basis everywhere they miss just so much of being comparable.

For instance, the loss on inside wiring because of disconnection of a subscriber's station has been chiefly a matter of estimate, the estimates running all the way from eighty cents to five dollars per station.

The correct loss on disconnections can be obtained by means of a special routine work number, and having once been established perhaps for different classes of stations will serve to bring to light excessive costs at a particular exchange or in a certain district or division.

It will also be valuable information for judging the advantage of the plan of leaving subscribers' equipment in place for a time, in the hope that a new occupant of the same premises may want telephone service.

The same process can be applied to "drop" wiring and similar information made use of.

A comparison of the payrolls of certain exchanges or districts will indicate more economical work at one place than another, and also the relative labor costs for different but comparable types of plant, such as open wire or aerial cable. By the judicious use of such information, economies in field work can be effected and the expense and soundness of changing from one type of plant to another can be determined.

The proposed routine for material accounting provides that all material shall be carried in the supply department material account until reported used. This makes possible a monthly report by exchanges or districts of the value of material in each. It will probably be possible to establish some average relationship between the amount of material carried locally and the number of subscribers, and if this turns out to be the case, much can be done toward keeping down scattered stocks of material.

These are only a few of the possibilities in the way of getting information out of accounts by means of the standardization of routine clerical methods. The application of this general principle will undoubtedly tend toward the simplification and reduction in cost of clerical operations, but this is a by-product hardly within the scope of this paper.

Enough has been said to indicate the variety and range of statistical possibilities yet undeveloped or only partially developed in the telephone business, and to connect them with the everyday problem of increasing our efficiency.

Let us turn now to the actual use of statistical data in administration. There is on the one hand a disposition to use uncorrelated facts as proving points which have varied and often complicated elements. A warning as to the dangers and injustice of this is not out of place here.

On the other hand, there is often a reluctance to use statistical data in direct dealings with the individual. This, I believe, is partly because the administrator has not thought out to its logical conclusions just what the data means, and hence finds it easier to deal in glittering generalities.

He has also some feeling that the presentation of a disagreeable record amounts to a charge of inefficiency. In my view it is rather to be taken as a method of giving the individual an opportunity to prove his efficiency, or to show the steps he means to take to remedy his relative inefficiency.

Whenever figures showing a poor record are put up to any man his first natural impulse is self-defense,

and the form of his defense, in a great variety of expression, quite commonly amounts to one or both of these two explanations.

1. The figures lie.
2. My conditions are different.

Now, since either of these excuses may have some degree of validity, let us examine them further.

The excuse that the figures lie is rather dangerous, since the true figures may be even more damaging than the false. No one should have the temerity to make this answer, unless he has at least some circumstantial evidence to support it. Such evidence ought to be followed by a refiguring. Suppose such evidence is plausible enough to put the burden of proof on the man who prepared the figures. He should then outline the sources from which the figures are derived, and his reasons for his method of figuring. His reasoning should be accepted unless better reasoning is shown. His sources of information, if unbiased, should be accepted unless shown to be erroneous. If the information comes from a biased source it should, of course, be corroborated by other and unbiased evidence.

Again, it is usually possible for the administrator, by simple processes, to decide whether any given figures are substantially accurate or substantially inaccurate. This, for the purpose of testing individual efficiency, is more important than arithmetical accuracy.

But suppose the net result of the discussion along these lines as to any particular figures is that inefficiency is not proved. None the less, the burden continues to rest on the individual to prove that he is efficient.

The plea that different conditions extenuate an apparently poor record should not carry much weight unless there is some evidence that the difference in conditions compares fairly with the difference in records.

Of course no two situations in the telephone business are exactly the same, but the end and aim of all our telephone service is fundamentally the same; we all have about the same chance at getting informed about our work, and we all have some responsibility for our conditions being what they are.

It is true that we all have some peculiar advantages and some peculiar disadvantages as compared with each other.

But a careful analysis of differences in conditions will, I think, generally result in exposing differences in the efficiency of men in dealing with their conditions, assuming, of course, that all the data has been properly correlated.

Now, if these principles are accepted, viz.: that efficiency is the vital thing, that it is to be gauged in the whole business, the company, the department and the individual by significant facts, and that significant facts are largely statistical facts, then the question is what can we do to get and use statistical facts for this purpose? Are we going to wait until some one comes along and tells just what to do and how to do it? Those who wait will be left behind.

Can accountants and statisticians ever master all the ideas, practices, operations and possibilities in the detail administration of the business and formulate a statistical method for every piece of work? Probably not.

The knowledge of just what details are needed comes only through daily contact with the problem, such contact as only the field forces and the detail administrators can get. The accountant can simplify and harmonize processes and can develop, arrange and interpret general data, but the field for study and interpretation of specific data applying to his own particular work lies open to every man ambitious enough to enter it.

The Telephone and the Single Phase Railroad

In a paper entitled "The Log of the New Haven Electrification," which was read before a recent meeting of the American Institute of Electrical Engineers. W. S. Murray, electrical engineer of the New York, New Haven & Hartford Railroad, said:

"Single-phase electrification affects telegraph and telephone systems whose wires lie parallel with and in close proximity to the railroad. The corrective for this disturbance has proved to be simple and not costly. Briefly described, it consists of compensating transformers whose secondaries are a part of the telegraph and telephone wires and whose primaries receive their voltage from pilot wires strung on the same cross-arms as those bearing the telegraph and telephone wires, and thus having impressed upon them the same voltage, by electro-magnetic induction, as the telegraph and telephone wires. The transformer secondary voltage is approximately equal and opposite to the induced voltage on the telegraph and telephone wires and thus constantly compensates for it throughout all ranges of induction due to the single-phase wires. The compensating transformer obviates the necessity of any change in the physical location of the telegraph and telephone lines within the zone of induction."

Minor M. Davis, who was not present at the meeting, made the following comment by letter:

"It is possible that Mr. Murray's remarks about the effect of single-phase currents upon telegraph and telephone wires will be misunderstood. Transformers are by no means completely corrective, although to some extent they are beneficial. The transformers on the New Haven road are applied only to single-wire operation and they do not neutralize the disturbing effects of the single-phase electric current sufficiently to permit the operation of duplexes, quadruplexes and printer circuits upon the wires. This means that one-half or two-thirds, or even a larger proportion of the carrying capacity of the telegraph wires is destroyed, notwithstanding these transformers. To apply these transformers several otherwise idle wires must be carried upon the poles and these wires and transformers are objectionable. They complicate single-wire equipment and prevent the operation of multiplex systems. Although Mr. Murray refers to the pilot wires and transformers as "not costly," they involve considerable expense. It is more or less of an open question whether it is the duty of a corporation to prevent its electric current interfering with the current of another company or whether it is the duty of the latter to provide its own protection. There is no disposition on the part of the telegraph companies to in any way retard the advancement of the art of applying power. They are willing to exercise all reasonable patience and they would be glad to have the power companies adopt a simple and inexpensive remedy for these disturbances. The writer has given much attention to the subject, but he knows of no remedy for this difficult problem, which is at the same time simple, inexpensive and complete."

The Making of Telephone Cable

By D. H. Braymer

THE terrible record of damage suffered by wire-using companies as a result of the sleet storms which swept across northern Ohio, Indiana, Illinois and Iowa during the month of February, last, holds more than passing interest for constructing engineers.

Damage by Sleet to Open-Wire Construction.

Rural lines and exchange constructions were totally ruined over the above area in a strip about sixty miles broad. With the usual promptness, etc., repairs were immediately made by the larger companies, but the smaller independent and rural companies in many cases have not even yet started. Some of these companies have announced that they will abandon the business and allow their entire investment to be lost, such is their damage. Others state that they will rebuild, if allowed to increase rates so as to secure reserve funds to provide for future storms.

To illustrate what this sleet storm means it is only necessary to review a few of the actual losses mentioned above. For the Home Telephone Company at Logansport, Indiana, 1,200 telephones were put out of commission and most of the rural lines require rebuilding. The Monroeville Telephone Company, Monroeville, Indiana, with $25,000 capitalization, only four years old, lost ten miles of lines, poles, arms, wires, etc. This together with the rebates paid for loss of service amounted to a $10,000 loss; that is to say, this company lost two-fifths of its property in this one storm. Supposing that the company never suffered any other losses, this alone is a depreciation of ten per cent per annum. The Putnam Telephone Company at Ottawa, Ohio, was another heavy sufferer, its entire plant being wrecked. A certain other company in Indiana had an investment of $50,000 and the estimator calculates that $30,000 is needed to make repairs and install full service. This company for the past four years has been paying fifty per cent dividends. Now it is up against a $10,000 loss from sleet which probably means no more dividends for the next three years.

This is a brief survey of the conditions to which the open-wire-using companies are subjected, whenever a storm is mentioned. They are loath to to admit that the force of the sleet is irresistible until they have actually suffered just such losses. Then it is too late.

The old way has served well, but now it seems necessary for telephone companies to insure their stockholders against unnecessary hazard. Some enterprising companies have already taken such steps and, as a rule, have adopted the use of a special cable. The remarkable growth of the telephone since the first few years of its existence, when lines were of common fence wire strung from house-tops, barns and trees, has necessitated the introduction of new methods of line construction adapted to the changed conditions.

The stringing of exposed wires on poles with brackets, cross-arms, and glass insulators worked all right for a time and under certain conditions is still practicable. But this method is not now considered advisable for lines of twenty or more two-wire circuits. As the number of lines increases difficulties are encountered; the poles are over-burdened by the addition of cross-arms, lines continually become crossed, and the wires, arms and even the poles are totally wrecked as was the case of those in the storm described.

In order to have sufficient strength to withstand even ordinary weather conditions, copper wire must be of such size as to make it extremely expensive. Iron wire is not desirable for many localities, as in the gas laden atmosphere of cities or in the salty air of coast sections, because of its susceptibility to chemical action. Aside from the great expense of maintenance such poor service is received that some sort of wire protection is imperative. For this protection the dry core type of lead covered cable is now most commonly used. This cable may be strung on poles in the usual way or it may be laid underground. The

Insulating and Twisting Machines with Individual Motor Drive.

former method is chiefly employed in towns and in the smaller cities, but in larger cities the underground method is preferable as poles are unsightly and take up valuable space. This type of cable has become so popular that the Western Electric Company has established a special cable department with a capacity of turning out twenty million conductor feet of telephone cable per day.

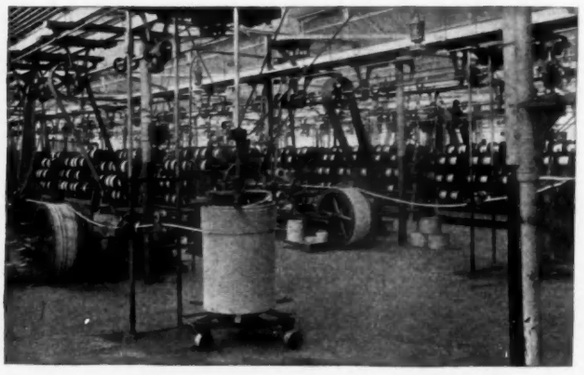
Lead Presses and Hydraulic Pumps Putting Sheath on Cable.

As already stated the dry core type of lead covered cable having the conductors loosely insulated with paper has almost entirely superceded the saturated core type, having its conductors separately insulated and all impregnated with an insulating compound, because of its lower cost and better transmitting qualities. It has also been found that cable having its conductors insulated by a single wrapping of paper gives the most satisfactory results in all kinds of aerial and underground cable.

The raw materials used in the manufacture of this cable are delivered to the factory storerooms in carload lots; copper wire in the forms of coils, lead in pigs and insulating paper in rolls. The insulating paper is of a special make and is manufactured expressly for the purpose.

Each copper wire is separately insulated by a machine especially designed for the purpose. A roll of insulating paper is fastened to a head which is made to revolve. The copper wire is uncoiled from a stand on the floor. It is led up over a pulley, through the center of the head and around a capstan. The revolving head winds the paper spirally around the wire. The insulated wire continuing on is then wound on a spool placed directly under the machine. Next the insulated wires are twisted in pairs. The insulating and twisting machines are individually operated by electric motors, thus doing away with all overhead shafting, pulleys, belts, etc.

The twisted pairs of conductors are then sent through the stranding machines and formed into core which is made in sizes from five to six hundred pairs. This machine is divided into sections called drums. To these sections or drums are fastened the spools upon which the twisted pairs are wound. As the drums revolve, these pairs are unwound from the spools and, passing through a perforated iron disk attached to the drum and revolving with it, are stranded into the core in layers, each layer running diagonally across the one immediately within it. A sufficient number of spools are used on each drum to form a complete layer of core and as many drums can be used as is desired, depending upon the number of pairs on the cable which is to be stranded. At each section is a button,



Stranding Machines and Cables Being Formed into Core.

which enables the whole machine to be stopped instantly from almost any point. During this process the stranded core is covered with a close spiral wrapping of two ribbons of insulating paper, each one overlapping the other. This wrapping is very strong, free from chemicals, and capable of withstanding great heat.

After the core is formed a test is given for the continuity of every wire in the cable, also a test for short circuits and grounds. It is then wound automatically on an iron truck and thoroughly dried in an oven, usually from twenty-four to forty-eight hours.

The last process is that of encasing the core in its lead sheath, which merely serves to protect the conductors from mechanical injury and moisture. The lead of which this sheath is composed contains a small quantity of tin, which serves to give it the greatest resisting qualities with the least possible weight. In submarine cable the conductors are still further protected by a covering over the lead sheath consisting of jute, galvanized iron armor wire, and hemp treated with preservative and water-proof compounds. By means of the lead presses and hydraulic pumps the lead, being heated just enough to become plastic, is forced under great pressure into a die block through the middle of which the core is drawn, thus encasing the core in a seamless sheath of lead. A small portion of the sheath is forced through the die block before the first end of the core appears and this is bent in and closed up in order to keep out the air. The last end of the cable is sealed in a similar manner. As the lead sheathed cable comes out of the presses it passes over a trough of mirrors, thus enabling the workman to inspect the entire cable and to detect any possible flaws in the sheath. Finally the finished cable is reeled and lagged and is then ready for shipment.

After every process in the course of construction, the cables are subjected to the most exacting tests. They are particularly noted for their high insulation resistance and low capacity between conductors. No effort is spared to make them perfect in every detail.

Since a telephone cable, as stated above, is now constructed of high insulating resistance and low capacity between conductors, which tests show such cable to be, most engineers will agree that its insulation will defy sleet storms and insure to telephone companies low maintenance cost, low depreciation and, best of all, permit them to bid adieu to their snow shoes and trouble shooting gangs. A few more such storms as those of last winter, with their attendant havoc, will make every telephone manager a cable enthusiast.

Handling Trouble

By J. P. Boylan

THE maintenance of the switchboard apparatus, line and substation equipment in a manual telephone system is so closely allied to the actual traffic conditions that it has been found advisable in large companies to have these two divisions under one head. The varied reasons which lead up to this conclusion and the fact that most operating companies have adopted this plan in their line of organization, are in themselves the best arguments in its favor.

The one effort of the telephone manager is to have as low a maintenance expense per telephone as possible, consistent, of course with the prompt and proper repairing of trouble. There are many ways in which this can be accomplished. In the writer's opinion the best and most economical course to pursue is to continually anticipate trouble, bringing it to light by persistent inspection of exchange apparatus, cable boxes, aerial lines and substation equipment. In this manner many scrapes, cutouts, etc., are discovered and before any irregularity can become prominent enough for the subscriber to note and complain of it is detected and regulated. A natural result of this would be a more contented lot of subscribers and a better and more economically maintained plant.

Another good practice along this same line is to make a nightly voltmeter test from the last section of the multiple on all subscribers' lines, also a talking and ringing test of all switching cords and trunk lines between exchanges. This can be done by the operating force without added expense on account of the traffic being light during the small hours of the morning.

The aim of the telephone engineer of today is not alone confined to constructing a plant so as to experience a minimum amount of trouble but also to provide ways and means to quickly detect the existence of trouble and to install apparatus to facilitate the testing and clearing of same.

With the old magneto system the telephone company relied in a great measure on the subscriber first detecting and reporting trouble on his line but a great improvement in this respect was brought about in the advent of the common battery switchboard, because a sleeve ground or short circuit on a line would bring in a permanent signal, thereby giving the operator an automatic report—so to speak—of the trouble.

It only remained, therefore, for the telephone engineer to devise some method of notifying the operator of a tip ground which, while not bringing in a permanent signal or preventing a subscriber from calling the exchange, would nevertheless result in false "don't answer" reports caused by part or all of the ringing current going to ground. In some instances this trouble makes the line more or less noisy.

This is one of the most aggravating troubles which has annoyed the telephone manager for the reason that the operator has nothing to indicate to her that trouble exists. The old saying "A disease once known is half cured" can be well applied to any such case of unknown or intermittent trouble.

The "don't answer" irregularity has recently been adjusted by the use of a protection relay provided in

DAILY TROUBLE REPORT

The Home Telephone Company of Detroit

DEPARTMENT OF SERVICE

Date .....

Exchange ..... District ..... Weather A. M. ..... P. M.

	Central Office Line		Cen. Office Protector	Cable			Cable Terminal		Aerial Line	Sub-Station Protector		Sub-Station Line	SUB-STATION INSTRUMENT														MISCELLANEOUS										SUMMARY	Action Trouble	O. K. on Test	TOTAL
Subscribers Line Trouble	Sw'bd cable	Sw'bd conn.	Conn. frame	Main frame	Heat coil	Carbons	Underground	Aerial	Dist. head	Terminal strip	Fuses	Running wire	Main line	Drop wire	Fuses	Heat coil	Carbons	Line wire	Ground wire	Ext. pedestal	Transmitter	Trans. cord	Mouthpiece	Rec. cord	Receiver	Rec. cord	Discharges	Hook switch	Ringers	Condenser	Pedestal cord	Ext. drops	Mag. ret. bell	Vib. ret. bell	Battery	Meter	Misery detec	Dialette										
Short circuit																																														
Ground																																														
Cross																																														
Open																																														
Ground																																														
Swing																																														
Line reaction																																														
Face transmission																																														
Connections																																														
Changed																																														
Adjusted																																														
Line going																																														
P. B. X. Substation																																														
TOTALS																																														
Switchboard Trouble	Line lamp	Supv'y lamp	Disc lamp	Answ'g jack	Multi jack	Lamp jack	Line relay	Cut-off relay	Supv'y relay	Protection rels	Disc relay	Ringing key	Listening key	Order cir. key	Line cord	Switch cords	Plugs	Opr's ret. coil	Opr's set	Repeating coil	Rec. coils	Condenser	Position wiring	Common wire	Connections	Fuses	Generator	Battery	Order circuits	Int. trunk	Busy jack	Drop	Ringer	Cords	Plugs	Disc lamp	Ans'g jacks	Plug rests	Desk	TOTAL	Found O. K.	Fixed (what)							
Central office																																														
P. B. X.																																														

EXTRAORDINARY TROUBLE

Underground / Aerial — Cable Break. Cable No. ..... Lines out of Service. Location of Trouble .....

Cause of Trouble .....

Signed .....

Wire Chief

The Daily Trouble Report.

the ringing circuit, instead of using the ordinary resistance lamps or coils. This relay is equipped with a double winding; one being a non-inductive and the other an inductive winding. When the ringing current is employed on a clear line it operates through the non-inductive winding but there is a short or ground on the line which shunts out the resistance of the substation

TROUBLE TIME SLIP

DATE.....190.... DISTRICT NO.....

TEL. NO.	LOCATION	MIN.	TROUBLE FOUND	CAR TKTS.
	TOTAL			

TROUBLEMAN

ENTER MATERIAL ON OTHER SIDE

Troubleman's Time Slip.

telephones, the inductive winding of the protection relay is brought into play, pulling up the armature and cutting in sufficient resistance to prevent a dead ground of the ringing circuit. When the relay is operated an extra set of springs on a local circuit causes a pilot lamp to light in front of the operator which indicates to her that the line she is calling is out of order.

Another feature which facilitates the handling of trouble, perhaps more than any other, is the installation of an out-of-order cord system. The circuit originates at the wire chief's desk where a jack and two lamps (white and red respectively) are installed for each line. Terminating at the last position of the switchboard are mounted cords and plugs, one each to correspond with every set of signals on the wire chief's desk.

A permanent signal coming in at any hour of the night can immediately be plugged out at the end position by the operator in charge. As soon as this plug is inserted in the multiple an out-of-order tone is put on the line so that any operator testing a line so plugged will recognize the tone and report accordingly to the subscriber. An order wire is generally used during the day time so that any operator can report a permanent signal to the trouble operator located at the end position who, when inserting out-of-order cord in multiple, puts out the line signal; after which she reports line and out-of-order cord number to the wire chief by order wire. As soon as a line showing a permanent signal is plugged with an out-of-order cord both signals associated with such cord will light on the wire chief's desk, but when line is cleared the upper or red signal will go out.

The wire chief is provided with an order wire to trouble operator by which he orders up test cords and orders down out-of-order cords.

Another advantage is gained by these out-of-order cords from the fact that the troublemen, when working on a line, are able to operate signals on the trouble desk which can be answered immediately by the wire chief, thus saving the troublemen much time which they otherwise would be compelled to spend in calling over another line to get a test.

The wire chief's subscribers' lines are multipled on the monitor's desk in the operating room so that by operating a switch at the wire chief's desk, the calls can be promptly answered by the trouble operator at night without transferring.

No set rule can be outlined for the arrangement of troublemen's districts. The physical condition of one district may differ materially from that of another, as may also the numbers of telephones per square mile. The general average, however, in large cities is about one thousand telephones per troubleman.

Where several troublemen are employed the best results have been obtained by having them receive and report back on all trouble by telephone. This will mean the saving of time in keeping them in their districts, it being only necessary to come to the office for material.

As the troubleman receives each case by telephone he enters it on a daily trouble slip and from these trouble slips the daily trouble report is made. The permanent record of trouble, however, is maintained on the subscribers' cards, which are arranged numerically in open envelopes. The card system is considered the best because a slip can easily become lost and would never be missed. Then again, the card will show at a glance

Subscriber's Card.

all cases of trouble which repeat, and this is especially valuable information to the wire chief, who would note such condition while writing up the last case of trouble on the card and takes steps to remedy it.

I want to emphasize here the importance of entering every case of trouble, however trivial, on the trouble cards. If this is done the wire chief's attention will be

called to the fact that Mr. So-and-so leaves his receiver off the hook a great deal, which fact being called to the subscriber's attention, he will unquestionably be glad to correct his fault. It is possible also that the line may swing to ground or short circuit in windy weather; but if every instance of trouble is reported, the wire chief in going over the cards will notice that something is wrong and will order an inspection of line which will bring to light the intermittent trouble mentioned. Thus the importance of insisting on every mechanical irregularity, whether it tests O. K. after it is reported or not, being entered on subscriber's card.

When a case of trouble is reported it is entered on the "daily trouble record." It will be noted that this printed form is arranged similar to the numbering of a multiple, there being a block of spaces for each one hundred telephone numbers. This permits the wire chief to tell immediately whether a certain telephone number has been previously reported and will also enable him to give a prompt reply to an information call regarding a line in trouble. The subscriber's card is then taken from the file and the first six vertical columns on lower part of card filled in. It is then placed in the pigeon-hole of the trouble district where line is located awaiting the troubleman to call in. After the case is given out the 7th, 8th and 9th columns on subscriber's card are filled in and the card is transferred to pigeon-hole just below the former one. There are then two pigeon-holes for each district; one representing trouble to be given out and the other which has been given to the troubleman.

When the lines have been cleared, the last three columns are filled in by the wire chief, and the card placed back in subscriber's file.

Beginning at the top of the subscriber's card and reading from left to right are spaces provided for the following: Telephone number; cable and pair; class of service; panel and jack; style of set and date installed for each of four party line subscribers. Location of terminal or cable pole where each of four party line subscribers are connected. Space for name and addresses for each of four-party line subscribers.

The vertical items heading the record of trouble are as follows: Date trouble was reported. Time reported. Letter of party line subscriber in trouble. (If entire line was out of order the notation "all" would appear here.) The nature of trouble. Result of wire chief's test. Time

The Home Telephone Company of Detroit

Troubleman.....

Was at .....

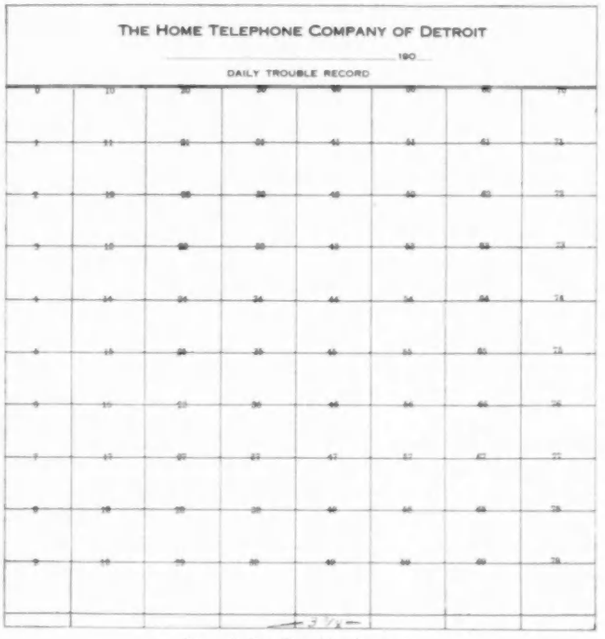
at .....M., ...190....

for the purpose of.....

and found premises closed. Should further attention be required, please call the "Trouble Clerk."

The Troubleman's Calling Card.

given to troublemen. Result of wire chief's test. Initials given to troublemen. Trouble found. Time O. K.'d by troublemen. Date O. K.'d by troublemen. The daily trouble report form reproduced herein can be used also as a weekly or monthly report. Its good points are that it embodies troubles of every description and at the same time subdivides each class of trouble, such as line and instrument, switchboard, cable, private branch exchange or extraordinary trouble. It also provides for a summary of trouble, shows the average duration of trouble, average time clearing trouble, and number of inspectors, borrowed men, etc. It is well occasionally to maintain such a report for each district, and summarize all



The Daily Trouble Record.

daily district reports in one monthly report. It is also a good plan to summarize all the daily reports for each district and to show a monthly report of every district so that a special study can be made to determine in what location a certain kind of trouble is abnormal.

Many so-called bad spots on the outside are due to wires in trees. At one time covered wires were used to clear lines of tree grounds but experience has proven that insulation will in a short time wear off, leaving an intermittent case of trouble and a more difficult one for the troubleman to locate. The only safe method to follow in this line is to use bare wire whenever possible and then to see to it that it is kept clear of all obstruction. When permission can be obtained, the tree should be trimmed; but being unable to do this, the next course to pursue is to extend the cross arms far enough to get necessary clearance. In some cases the trees spread on either side of the pole so far that it is necessary to run lock aerial wires from a point on cross arms where wires would best clear the trees.

Very often the lady of the house will report trouble on her residence telephone and while she is out shopping the troubleman will arrive and be unable to gain entrance. The lady returning and not finding the telephone repaired will criticize the delay occasioned. To obviate this, a small printed slip (a sample of which is herein shown) is left by the troubleman in all such instances.

This is only one of the little things which go to make up a well managed maintenance department, for anything, however small, which is done to keep the subscriber in a contented frame of mind contributes more than one would realize to the ultimate success of a company.

Rural Conference at Pittsburg

Ninety delegates from forty-seven rural telephone companies in western Pennsylvania, Ohio and West Virginia attended a rural telephone conference called by the Western Electric Company in Pittsburg May 20. Two days were given up to the sessions. Social enjoyment was combined with the business of the gathering in such measure as to make the two days' stay of the rural telephone men in Pittsburg a most delightful one.

In inviting representatives of the country telephone lines to attend R. M. Morris, sales manager at Pittsburg for the Western Electric, had written:

"From our experiences in the telephone field, especially among the smaller operating companies, we find that a great deal of trouble and expense is due to the fact that the employes of the companies do not thoroughly understand the construction, operation and maintenance of telephones and telephone lines.

"Understand this is not a lecture, but we will give practical demonstrations showing you the proper way to construct telephone lines, how to install telephones and switchboards, and most of all how to clear up

"Telephone Boosters" at Pittsburg.

trouble on your lines. We believe that these demonstrations will not only be interesting, but most beneficial to you.

"In preparation for the meeting, we would suggest that you make up a list of questions you would like to ask covering the difficulties you have had from your own experience."

Just as the invitation had announced, the chief topic of discussion at the conference was trouble on the line. How to make repairs quickly and well; how to adjust difficulties and keep affairs running smoothly were the subjects of short talks and demonstrations. This part of the conference the delegates found the most profitable.

The ninety delegates met in Pittsburg Thursday morning, May 20. Representatives of the Western Electric Company saw to their comfort and looked after them during their two days' stay in the city. The greater part of the first morning was spent in registering and shaking hands all around. The renewal of old friendships and the making of new acquaintances proved a most delightful feature. The delegates were taken to luncheon at a Pittsburg hotel as the guests of the company. A good session was held in the afternoon and instructions were given on telephone work.

After a busy afternoon on this subject relaxation was in order. The delegates were given a good dinner and afterward were treated to a vaudeville show.

The next morning was started promptly at nine o'clock with another session and further instructions. In the improvised theater on the third floor of the Western Electric Company's building on the north side a complete rural telephone set had been installed. With the aid of this equipment thorough and practical demonstrations of "looking for trouble" were given. At one o'clock the delegates went to luncheon as the guests of the Central District and Printing Telegraph Company, and later in the afternoon they inspected the plant of that concern.

All of this was so interesting that the farmers grew enthusiastic. A "Telephone Boosters" society straightway was launched. All agreed the idea was an excellent one. There were no dues or initiation fees, and each charter member was told to invite other telephone people in his district to join. The Telephone Boosters adopted as a badge a "blue bell" button with the initials "T. B." prominently displayed.

The conference will hereafter be an annual affair. Next year it will be styled the second annual meeting of the Telephone Boosters.

Boosting of course was in order all through the conference. Though the primary object of the gathering was instruction for the benefit of country lines, no opportunity to help along the cause of rural telephony in general was allowed to slip. All were urged to talk telephones to their neighbors and to help bring up the total of country lines in their own section.

Those who attended the convention came from Randolph, Rochester, Latrobe, Moravia, Murdockville, Burgettstown, Murrysville, Markle, McMurray, Hookstown, Derry, Kregar, Elizabeth, Belle Vernon, New Sheffield, Canonsburg, Portersville, Midway, Scenery Hill, Grove City, Westford, New Florence, Saxonburg, Tidal, Monongahela, Parkers Landing, Saltsburg, Freeport, Greenville, Cochranton, Harrisville, Hickory, Volant, Mars, Connoquenessing and Euclid, all in Pennsylvania; Knoxville, Conotten, Lowell and Harrietsville, in Ohio, and Eatons, Wellsburg and Berkeley Springs, in West Virginia.

Telephone Men Get Japanese Decoration

The Emperor of Japan, upon the joint recommendation of the Ministers of Foreign Affairs and of Communication, has conferred upon Mr. John J. Carty, chief engineer of the American Telephone and Telegraph Company, and Mr. U. N. Bethell, president of The New York and New Jersey Telephone Company, the Bell Telephone Company of Pennsylvania, and The Central New York Telephone & Telegraph Company, the Imperial Order of the Rising Sun. This has been done in recognition of services rendered by them in giving assistance to the representatives of the Japanese government who have been sent to this country within the last few years for the purpose of investigating the telephone systems and the management of large industrial enterprises.

At the Japanese Consulate it is said that this is the greatest distinction that can be conferred on a foreigner by the Japanese government.

The Ubiquity of the Telephone

By J. Rodney Bates

THE most distinguished churchman in the world is also one of the most constant and enthusiastic telephone users—Pope Pius X. When as Cardinal Sarto he left Venice, of which he was Patriarch, to attend the consistory at the Vatican which was to elect Pope Leo's successor, he bade his friends good-bye for a week, or, perhaps, a fortnight. He has never returned there, of course, and never again will step foot in the city so long as the Pope remains a prisoner in the Vatican. Shortly before he became high pontiff a telephone had been installed in the Vatican, and since then his friends and former parishioners have heard his voice many times over the wire. Last Easter he bestowed the apostolic blessing on his old parishioners by means of the telephone.

His sisters, to whom he is devoted, have gone to live near the Pope in Rome, and they are in daily communication with him. In fact, the telephone has played a prominent part in the life of His Holiness since the day he left Venice. During the consistory which elected him to his high office one of the cardinals was taken ill. The meeting was held, as such meetings always are, within sealed rooms, which could not be opened even though death intruded, until the election had been carried through. By means of the telephone medical advice was secured and the patient was treated from a distance, his medicines being sent up to the meeting room in the basket in which food for the assembly was hoisted from the ground to a window. The telephone saved his life.

Not least among the reasons for the universal popularity of the telephone is that it is equally useful to all sorts and conditions of men. If a Chinaman wants to send a telegram he has to write it first in his own impossible looking characters. Then it must be translated into English before the telegraph operator can tap it off. It is received and transcribed in English, of course; and finally it has to be turned back into Chinese again. But a Chinaman can talk by telephone as easily as you or I.

The devastation of San Francisco by earthquake and fire temporarily destroyed one of the most interesting telephone offices in the world. San Francisco's Chinatown, with its 40,000 population, had a special exchange of its own, which the Celestials used as freely as the white neighbors used theirs. The operators were Chinese, and the central office looked like a small Oriental temple where business was transacted under the approving eye of a first class heathen idol. Apparently the Mongolian absorbs American ideas fast enough when he once catches them, for Chinatown had its public pay stations, too, with pig-tailed attendants and almond-eyed messengers, and they did a flourishing business.

Six of San Francisco's eight telephone exchanges were left in ruins by the city's terrible visitation, but it is characteristic of American enterprise that before any other business even considered the possibility of resuming, the engineers began laying their plans for reconstruction. Within a week forty lines were in operation in the devastated district of the city. The two uninjured exchange offices meantime took up all the service that could be brought to them and long distance talking was interrupted only while fallen wires from outside were restrung.

In all our big cities the exchanges in the foreign quarters are used largely by foreign-speaking people. Perhaps the most surprising telephone subscriber, however, is the noble redman. The Sioux Indians on the Rosebud and Cheyenne reservations in South Dakota are officially reported by the government as having 320 telephones.

Special apparatus and special instruments have been devised to meet special needs. Telephones are placed in mines and tunnels to keep every part of the borings in constant touch with the main shaft and the surface. In rising skyscrapers they are used by workmen a hundred feet up in air, it may be, to communicate with the man at the donkey engine on the ground. Lumbermen build telephone lines through the forests, with stations here and there in boxes nailed to tree trunks, and

the saving not only of property but of human life which has been made by this means of quick communication is tremendous. When jams form, the telephone is used to notify the men upstream to hold back the logs until the obstruction is removed, thereby simplifying the dangerous work of the river drivers and often preventing a loss of thousands of dollars. In some places the woodsmen are snowed in for weeks and weeks at a time. There you may see a man getting his mail over the telephone—having his letters opened and read to him by someone in his office, fifty or a hundred miles away, and dictating the answers over the wire to a stenographer.

On western rivers great flotillas of timber, towed by those curious stern-wheel steamers that are the most picturesque transports of American commerce, and followed by a craft loaded with woodsmen, are managed by means of a telephone between the two boats. A recent development of telephone use is the installation of telephone lines throughout government forest reserves, where fire is a constant menace and the giving of a prompt alarm may save thousands of acres of valuable trees. The famous woods of Plymouth, in which the Pilgrims found their first habitation on these shores, are protected by a cordon of telephones. Telephone lines in New England have also been extended to the life saving stations, and in numerous cases have been instrumental in preserving both life and property in the severe Atlantic storms.

It was when a great ocean liner ran aground on the New Jersey coast and a telephone wire was extended from the shore to the deck of the ship, that this means of communication with the vessel suggested a new use of the convenient talking instrument. Now, when ships are tied up at their wharves it is a general custom to connect wires to telephone instruments on the vessels, or to pass through a porthole an instrument with a long reel of wire attached, so that people on board may talk with anybody having a telephone on shore. In the last moments just before the sailing of a trans-Atlantic liner the ship's telephone is in urgent demand for saying farewells and sending eleventh-hour messages.

A similar system has been adopted for establishing telephone connection with railroad trains, wires being connected to the cars whenever a stop of sufficient length is made. Trains have also been equipped with telephones by which the passengers could talk together from seat to seat or car to car. Many railroads use the telephone for train dispatching and for safeguarding the lines against accident. Its manifest advantages for such purposes are that it requires no expert knowledge, leaves no excuse for mistakes in transmission, and allows instant inquiry if orders are not perfectly clear.

The cross-country trolley lines, which have done so much for the rural districts, nearly all use the telephone for running their cars. Instruments in watertight boxes fastened to poles at turnouts and crossings, or portable instruments, carried on the cars and connected with wires brought down poles at the side of the track, or by means of a jointed rod, to the overhead lines anywhere, furnish a means of avoiding those mishaps which were so frequent and so disastrous at one time, from unsystematic running of cars and inability to communicate with the motorman or conductor, when once they got away from the terminal.

Two or three years ago the big department stores in the cities began keeping telephone clerks whose sole duty was to take care of the trade that came by wire. Now they have gone a step beyond this, and in Boston, New York, Philadelphia, and Chicago there are great retail business houses which have a telephone in every department, or on every counter. Thus a customer may talk from any distance with the sales clerk he is most accustomed to deal with, who knows best his peculiarities and requirements. One of Chicago's famous retail establishments has a private branch exchange switchboard that requires 13 girls to operate it, having 92 trunk lines to the central offices of the telephone company and a thousand instruments connected with them. At least two of New York's big shops have equally large installations, and a great store now under construction in Philadelphia has already contracted for a branch exchange with 3,000 telephones, while in Boston and other cities the idea is being taken up on a corresponding scale.

The destinies of nations sometimes hang on the telephone. General Oyama in his attack on Mukden moved his army in a crescent ninety miles long and divided into five sections, each of which was in telephonic communication with the general staff. The Japanese commander thus had his entire force under absolute control and operated it as a huge, perfectly adjusted machine. This method was employed by the Japanese throughout the Manchurian campaign. The wires were strung on bamboo poles, or laid along the ground, as the armies marched, and in battle were carried right up to the firing line.

The telephone is one of the many forces of civilization the Japanese have acquired from America, and the finely equipped exchange in Tokio is good evidence of the little brown man's appreciation of modern Yankee utilities. Not only did they learn its possibilities here, but they were shrewd enough to

see that they could do no better than get the men who had developed and were perfecting it to assist and advise them. The plans and specifications of the talking system of the flowery kingdom are based on those prepared by the engineers who lay out the big systems of the United States.

The telephone is having a powerful effect on our own political life. Senator Hanna is said to have inaugurated the extensive use of the telephone in politics when he was guiding President McKinley's campaign. Mr. McKinley sat at his home in Canton, Ohio, and talked with his representatives and managers in 38 states and territories, being in instant touch with the situation throughout the country east of the Texas panhandle.

Since then politicians and statesmen have used the talking lines more and more. Governor Folk employed them in his famous campaign in Missouri with great effect; William Jennings Bryan one evening addressed four or five thousand people scattered over hundreds of square miles by talking into a transmitter that was connected through all the central offices of the surrounding territory with as many subscribers as wished to hear his speech; President Roosevelt's guidance of the peace conference at Portsmouth was maintained by means of the long distance wires, and he constantly employs the telephone for the most important and confidential business. There is a large private branch exchange in the capitol at Washington, and recently the government has provided all its various departments with facilities of this kind in place of the large number of detached instruments they formerly used.

The telephone has made the people of the rural districts a very active power in the nation's political affairs. No longer are the citizens of the smaller and more distant places dependent on wandering speakers, on spasmodic, individual efforts, on the weekly press or the daily mails when great policies and interests are at stake. The doings of the party machines are known now to the farmers almost as soon as they occur, frequently before the newspapers have reported them. The political roorback has become a thing of the past since it can be denied and exposed as rapidly by telephone as it can be circulated.

New England was the first group of states east of the Mississippi to send aid to the earthquake sufferers in San Francisco. This distinction was brought about very largely by the general use of the telephone, which nowhere else and never before, probably has been employed as extensively in a great emergency as it was here in the days immediately following the California disaster. At a meeting of the influential men of Boston at the mayor's office of the city on the Friday following the earthquake Governor Guild of Massachusetts announced that he had prepared an appeal to the whole state. The question was how this call to the people could be sent broadcast in the least possible time. Mr. Frederick P. Fish, president of the American Telephone and Telegraph Company, who was at the meeting, suggested that the message be telephoned. Through him the New England company undertook to deliver it to every mayor and to the chairman of every board of selectmen in the commonwealth personally, over the wire or by messenger, in a few hours' time and without charge. Governor Guild gladly accepted the offer, and at 5:30 in the afternoon the work of telephoning his appeal from one end of the state to the other began. Three hundred and fifty-four different places were to be reached, and before 11 o'clock that night the proper official in all but one of them had been communicated with. The exception was a little town way up in the Berkshire hills, which was five miles from the nearest telephone, so that the delivery of the message involved a difficult drive at such a late hour that it was deemed advisable to wait until the next morning.

It is an interesting fact that in several cases town and city officials responded that they had been awaiting such a message and would immediately send out calls for mass meetings. If the postal service or the press, efficient as both are, had been depended upon the majority of the men whom the governor addressed would not have received his word until the following day. At the same time that the proclamation was telephoned to the public officials it was communicated over the wires to the newspapers and to the Associated Press. The official in charge of the undertaking at the New England company's headquarters in Boston had the assistance of seven young men stationed for the time being at the toll switchboard from which the long-distance lines are operated. So rapidly was their work done, and so efficiently, that a remarkable record was made right through the five hours and a half of one communication in every 55 seconds.

When the Massachusetts relief committee organized its work the telephone company equipped its headquarters with a private branch exchange and provided free service, long distance as well as local, as its contribution. There can be no doubt that the means of speedy communication to any point thus afforded has not a little to do with the splendid promptness with which the committee was able to collect and distribute the generous contributions of its fellow citizens.

Teacher—"Who is the greatest inventor?"

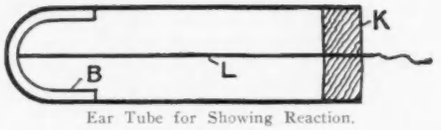
Shaggy-Haired Pupil—"Pat. Pending, I guess. I see his name on more inventions than I do any other man's."—*C. W. T., in Chicago Daily News.*

Reaction of the Ear to Alternating Currents

J. Rieder, in *Prometheus*, reports on some observations which he has made and which seem to show that under suitable conditions the tympanum of the ear is sensitive to electric alternations, so that we have, as it were, a special sense for certain electric conditions and can become directly cognizant of the same. We quote in outline the author's own words:

In the telephone we observe indirectly the alternations of an electric current by first converting them into vibrations of a membrane or disk, which latter then transmits the sound to the ear in the usual way. In the course of some experiments I have observed that the human ear can also react directly to alternating electric currents. The extremely simple apparatus required is shown in the accompanying diagram. *R* is a small test tube, with a metal coating, *B*, extending about one-fourth of the length of the tube. From this coating a metal rod, *L*, passes outward through the cork, *K*, which is fastened down with sealing wax. In fact, the tube forms a small Leyden jar without any outer coating.

If now the rod *L* is connected with one pole of a small induction coil, and the tube is held with its silvered end near the ear (taking care not to touch the connecting wire), a loud noise is heard on touching the second pole of the induction coil with the free hand. The same effect is produced without touching the second pole, if the latter is earthed. This occurs even if the observer is insulated from the ground by a pair of rubber shoes, although the sound is then diminished in intensity.



Ear Tube for Showing Reaction.

The cause of this phenomenon seems to be rather simple to explain. The human body, and with it the ear drum, is charged by the successive current pulses, while the coating of the tube receives a charge of opposite sign. Thus the ear drum is set vibrating and we have the sensation of sound.

The sensibility of the ear was not very great, using this simple apparatus. The currents in a telephone could not be thus detected. But it must be remembered that the distance of the metal coating from the tympanum was very considerable, and perhaps better results could be obtained by means of a specially constructed small tube inserted into the ear. It seems possible that in this way sounds might be made audible to deaf people.

These experiments leave a certain after effect upon th observer, a sense of pressure in the ear, showing that the ear is affected in a manner quite different from that involved in listening to an ordinary telephone. This seems to be a warning that a certain amount of caution will have to be exercised in conducting such experiments.

The sound can also be observed with an ordinary telephone if the two wires are connected to one terminal of an induction coil the other terminal of which is touched by the observer. This seems to indicate that disturbing noises which often occur in the telephone may not always be due to vibrations of the disk; they may be due directly to high-potential atmospheric electricity, without the intervention of the electromagnet. In some experiments made with a frictional machine a sharp sound was heard at the passage of each spark. It seems quite out of the question that the disk of the telephone was in this case acted upon by the electromagnet.

These observations may perhaps have a practical application. If the author's view is correct, that charges upon the telephone lines, due to atmospheric conditions, may act on the ear, not through the medium of the telephone disk, but directly, then it will probably be possible, by suitable construction, to eliminate the disturbing "accidental" noises, which often render conversation over the telephone unintelligible at the approach of a thunder storm.—*Scientific American.*

Steering a Boat by Telephone

A man stood in the pilot house of the tug Eugene F. Moran with a towel bound across his eyes and held two rubber discs, with wires attached to them, against his ears. The tug was three miles out on the ocean, beyond the Ambrose channel lightship, headed harborward, and the blindfolded man was steering for the lightship.

"Switch," he said, and one who stood near him moved a little lever across the face of a copper dial screwed against the wall of the pilot house.

"Switch," came the order again and the lever moved back. The blindfolded one then paused a second and called the skipper.

"Port about two points. Lightship lies just a shade to port."

For three miles the man who could not see gave orders to the skipper at the wheel, which was not turned a fraction without his orders. At the end the tug brought up close under the stern of the lightship.

What the man with the discs at his ears heard was what guided the tug. Through the rubber diaphragm in each of the receivers there flowed a confused roaring like buzzing telephone wires in a gale, but at regularly recurrent intervals this roaring was broken sharply by another sound:

"Ding, ding, ding, ding."

The sound of the submarine bell of the lightship, carrying three miles under the waves, was registered against receiver tanks on the tug, to be transmitted through microphones floating in each of these tanks up over telephone wires to the receiving discs that were held by W. J. Fay, the blindfolded man.

Fay is assistant engineer for a marine signal company and was guiding the tugboat under simulated fog conditions. The reiterated taps of the bell that were heard spelled the code number of the lightship, No. 22.

Had the tug been lost in one of those heavy blankets of mist that settle down outside the Narrows instead of loafing about in bright sunlight Fay, it is alleged, could have taken the craft to the lightship and could have determined within a quarter of a mile how close to the lightship his boat was.

The test was a severe one because of the light draft of the tug. The company's officials pointed out it is only with deeper draft vessels the bell signal works at its best.

This is said to be because the water directly beneath the surface of the ocean to the depth of ten feet or so is more or less filled with air, because of wave action, while below that depth a more uniform medium exists, which greatly facilitates the transmission of the sound emanating from the bell.

Ocean steamers, it is said, can pick up the lightship bell at five miles.

The company is working on experiments to evolve a more powerful sound producer for submarine signal work.

Of Interest to the Trade

New Type Kellogg Switchboard

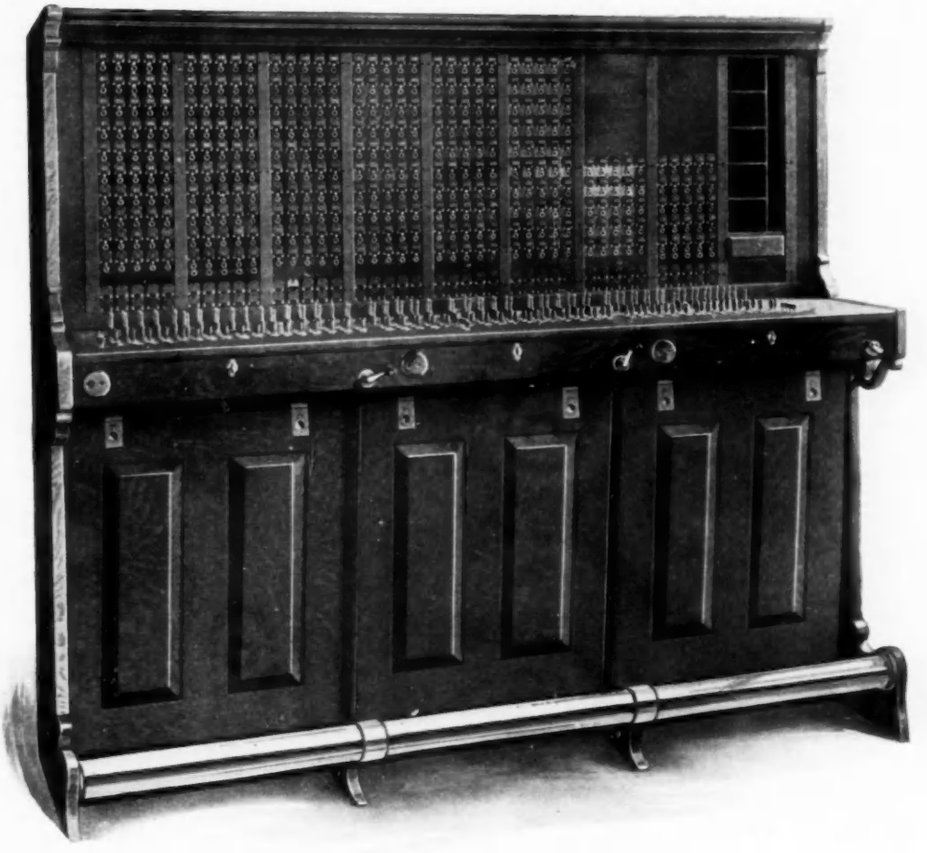
The Kellogg Switchboard and Supply Company has made numerous improvements in the express type magneto switchboard which it has had on the market for the past nine years.

Probably the most noteworthy improvement is the new No. 20 drop type combined self-restoring drop and jack. The No. 20 type has all of the advantages of the old No. 3 type, with the additional features of a platinum night alarm contact perfectly protected by the shield below the shutter, and a drop coil which can be removed in a few seconds' time by the aid of a screwdriver and without unsoldering any connection whatsoever. The entire operation of removing the drop coil is carried on from the rear of the board, so that it is not necessary to disturb the operator in any way. This feature will especially recommend itself to telephone companies operating in sections of the country where trouble is experienced from lightning or high-tension circuits. The front view of the switchboard illustrates the accessibility of any line on the board to any operator, and it is only necessary to transfer connections from subscribers appearing in the first two panels to those appearing in the last two, or vice versa. This not only increases the speed of operation, but decreases the cost of operation. This point will be fully appreciated by operating companies who have been burdened with the type of board requiring the majority of connections to be transferred from one operator to another for completion.

The efficiency of operation has not been the only point considered in this type of switchboard, but special attention has been paid to the maintenance of the equipment. It is a very easy matter to change any drop coil without interfering with adjoining apparatus or in any way mutilating the cable forms. The cord terminals are conveniently located, and all other apparatus, such as condensers, repeating coils, induction coils, etc., are located on the hard maple panel in the rear of each position. All terminals are lettered and numbered in accordance with the blue print furnished with the switchboard.

All of these numerous advantages, added to the standard quality for which Kellogg apparatus has always been known, make this a splendid magneto equipment in efficiency and operation.

In addition to contracts which the Kellogg Switchboard and Supply Company recently made for two complete new exchange equipments in Arizona, they have recently closed contracts for two complete harmonic common battery exchanges in that state.



The New Kellogg Switchboard.

Western Electric Items

The Western Electric Company has put into booklet form the story of its record-breaking restoration of the burned out Gutenberg exchange at Paris, France, a description of which was published in the January number of TELEPHONE ENGINEER. Three pages of reproductions of headings from prominent news and trade papers are also printed, showing the amount of publicity gained by the achievement.

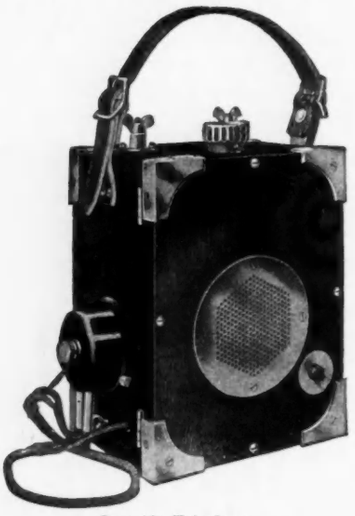
The report that the General Electric Company had arranged to take over the heavy machinery manufacturing branch of the Western Electric at Hawthorne, Illinois, was declared by an officer of the company to be without foundation.

During the last month the company, on the basis of business in sight, has taken advantage of the low

price of copper to purchase more of the metal than it has bought for a long time. The company's consumption, however, is still below the rate to be expected from the ratio of operations. Its stocks of metal on hand are still only nominal.

Gross returns for the year are expected to reach $50,000,000.

Telephone Engineer is indebted to the Western Electric Company for the illustrations which accompany the article on "The Telephone in Fighting Forest Fires," by W. H. Radcliffe, which appears in this number. This company supplies the portable telephone instruments with which the forest rangers are provided. The accompanying cut shows the type of instrument used. The case contains a buzzer, hand generator, switch, receiver and cord, dry cell, induction coil and transmitter.



Portable Telephone.

Automatic News

The Automatic Electric Company announces that it has recently closed contracts for the installation of complete automatic exchanges at Boone, Iowa, for 800 lines; Lethbridge, Alberta, Canada, for 1,000 lines, and Calgary, Alberta, Canada, for a branch exchange of 300 lines. The apparatus to be installed in these cities is the latest two-wire system and the telephones used are to be equipped with the new non-magnetic receivers.

The company has recently received from many companies already operating automatic exchanges orders for extensions to their present capacity, among which are the following: Home Telephone and Telegraph Company, Los Angeles, California, 3,000 lines; Home Telephone Company, Portland, Oregon, 1,500 lines; Citizens Telephone Company, Grand Rapids, Michigan, 1,000 lines.

Klein Appoints New York Representative

Mr. Harman S. Salt, 114 Liberty street, New York, New York, has been appointed New York representative of Mathias Klein and Sons, Chicago, manufacturers of linemen's and construction tools.

Pardee Takes Moore Agency

Alfred F. Moore has established a sales agency with Frank W. Pardee, 56 Fifth avenue, Chicago, Illinois. Mr. Pardee has been connected with the telephone and electric business for about twelve years and is very well and favorably known. In addition to the large stock of insulated wire, telephone cords, etc., carried at the Moore factory, 200 North 3rd street, Philadelphia, they expect to carry a stock with Mr. Pardee. Alfred F. Moore's concern is one of the oldest manufacturers of insulated wire in the country, and it will doubtless be gratifying to many western companies to know that they can obtain from Chicago stock Moore's standard line of telephone receiver cords, switchboard cords, switchboard wire, jumper wire, junior jumper wire and other classes of Moore's goods, so well and favorably known.

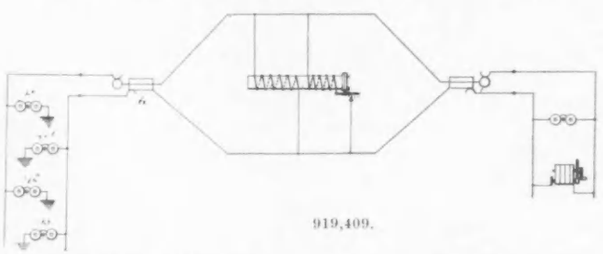
Recent Telephone Patents

By David S. Hulfish

It will be the purpose of this department to list all United States patents, as they are issued, which pertain to any branch of the telephone business, giving such data in each case as will enable the reader to judge whether he wishes to see the complete drawings and specifications of the patent. When patents of special interest to Telephone Engineer readers are encountered, the descriptive matter herein will be amplified accordingly. A complete copy of drawings, specifications and claims of any patent listed will be furnished from this office upon receipt of ten cents.

919,409. Clearing System. When the clearing drop of a magneto cord pair is rung down, it short-circuits the line with its night-alarm contact, or substantially so, and thus prevents ringing through to the distant connected line. Klas Weman and Thomas S. Hemenway, Buffalo, N. Y.

919,812. Telephone. A pressed metal wall set has the front door modeled to form the transmitter case also. Clarence E. Bilton, Bridgeport, Conn.



919,409.

920,043. Party Line. A junction box is used from which the stations radiate and from which the trunk connects to the central office. Selection is effected by disconnecting all but the station wanted, and lockout of the remaining stations also is effected. When the line is not in use, all stations are connected, that any may call. Arthur J. Farmer, Detroit, Mich.

920,258 and 920,259. Automatic Trunk. The switchboard operator has calling plugs only, and a calling line connects through the automatic trunk with one of her plugs, thus obviating the necessity for answering plugs. Sidney H. Browne, Pittsburg, Pa., assignor to American Telephone & Telegraph Company.

920,261. Harmonic Bell for Telephone Systems. William B. Bruce, Jr., of Springfield, Ohio, assignor to the American Automatic Telephone Company, Rochester, N. Y.

920,277. Attachment. A second ear piece is provided whereby the telephone user may listen with both ears. John L. Creveling, New York, N. Y.

920,350. Automatic System. This is a common battery system, using switches of the Strowger type, and controlling them to select by the use of the earth return. Jacob W. Lattig, Wyncote, and Charles L. Goodrum, Philadelphia, Pa., assignors to the American Automatic Telephone Company, Rochester, N. Y.

920,364 Ground Clamp. A metal band encircles the pipe to which the ground wire is to be attached, and convenience for soldering the wire to the band is provided. Charles W. Messner, Philadelphia, Pa.

920,424 and 920,425. Transmitters. In each of these patents, the resistance chamber of the instrument is of novel construction. Ralph C. Browne, Salem, Mass., assignor to John Abbott, trustee, Winchester, Mass.

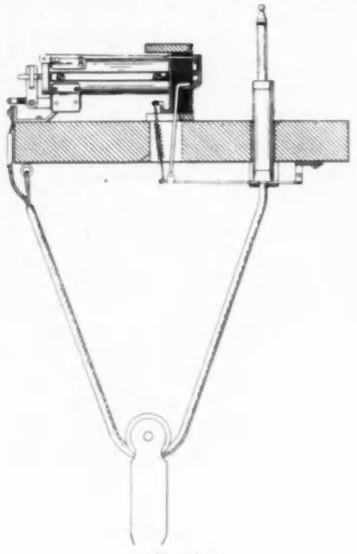
920,431. Transmitter. The novelty lies in a thick and rigid diaphragm and a resistance cell having a point only bearing in contact with the diaphragm. Charles L. Chisholm, Marysville, New Brunswick, Canada.

920,527. Attachment. A disinfectant holder for telephone transmitters. Frank L. Bigler, Kansas City, Mo.

920,624. Repeater. A mechanical device of the electro-magnetically controlled variable resistance type, having a moving receiving coil. Alexander Nikiforoff, Warsaw, Russia.

920,778. Protector. A novel type of so-called self-soldering heat coil. Charles A. Rolfe, Adrain, Mich., assignor to Rolfe Electric Company, Rochester, N. Y.

917,742. Telephone Pay Station. The apparatus of the Gray Pay Station Company is so designed that a coin dropped



921,384.

into the collection box makes distinctive sounds by striking against certain bells and clock gongs, then passing into the cash box of the device. In the present invention, Mr. Long has provided for passing the coins into a sort of hopper, where they are held subject to disposal by an electro-magnet which is under control of the central office, and by means of which the central office operator can dump all of the coins into a return chute in case no conversation is had. George A Long, Hartford, Conn., assignor to Gray Telephone Pay Station Company, of same place.

920,208. Circuit Breaker. A line fuse is shown, with clamp for attaching it to the line circuit at the insulator, supporting the fuse by attachment to the tie wire. Lewis C. Seele, Columbus, Ohio.

920,938. Transmitter Concentrator. A face plate and mouthpiece of special form to assist the action of the transmitter. Oscar F. Falk, Belleville, New Jersey, assignor to American Telephone & Telegraph Company, of New York.

921,119. Telephone System. An arrangement of loud-speaking telephones whereby speech at a single transmitter may be reproduced at a number of receivers, separately situated. Adolph G. Kaufman and Leopold J. Lippman, New York, N. Y., assignors to American Callaphone Company, of same place.

921,141. Submarine Telephone. An arrangement of telephones and circuits for receiving sounds transmitted by vibrations through the water, and converting them into electric telephonic currents, and vice versa. Arthur J. Mundy, Boston, Mass., assignor to Submarine Signal Company, Waterville, Maine.

921,145. Ground Clamp. A flexible band and a screw-clamp for tightening it about a pipe or rod. For use as an attachment for ground wires in telephone exchanges. Theodore Nagel, Chicago, Ill.

921,187. Telephone System. A testing circuit for two-way multiple switchboards. The tip of the calling plug is kept separated from the answering plug, for busy test purposes, until after the calling plug has been inserted in a jack. Harry G. Webster, Chicago, Ill., assignor to Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.

921,318. Telephone System. The novelty in the system lies in the construction and operation of the line relay. This relay is of but a single core, but has two sets of contacts, one set of which may be closed by a low degree of energization possible to be attained through the substation telephone, and being adopted to light the line lamp, and the other set of contacts being operated only when the relay is fully energized by the local signaling circuits within the central office, and competed by the insertion of a plug in the line jack. Harry G. Webster, Chicago, Ill., assignor to Milo G. Kellogg, of same place.

921,319 and 921,320. Signaling Systems. A combination of telephone and telegraph devices, for combined service with fire alarm, etc. Harry G. Webster, Chicago, Ill., assignor to Milo G. Kellogg, of same place.

921,321. Telephone System. A system for testing for busy lines with a two-way cord pair. Harry G. Webster, Chicago, Ill., assignor to Milo G. Kellogg, of same place.

921,334. Transmitter. In lieu of a bridge of the usual type, the inventor uses a cup-shaped element in which the resistance cell is secured, the diaphragm being placed over the mouth of the cup and secured thereto by a rubber band. This forms a complete working part, which may be installed in any case very quickly, and as quickly removed. Henry F. Albright, New York, N. Y., assignor to Western Electric Company, Chicago, Ill.

921,367. Telephone Bracket. A telephone arm of toggle-lever form for mounting a telephone set upon a side wall. Edward B. Craft, Chicago, Ill., assignor to Western Electric Company, of same place.

921,384. Clearing Drop. A self-restoring arrangement for the clearing drop of a switchboard, the restoring being effected when the plug is returned to its socket by a mechanical relation between the plug socket and the drop. Claude D. Enochs, La Crosse, Wis., assignor to the Vote-Berger Company, of same place.

921,385. Annunciator. An arrangement of combined drop and jack for magneto switchboards. Claude D. Enochs, La Crosse, Wis., assignor to the Vote-Berger Company, of same place.

Brevities of the Business.

PERSONAL NOTES.

C. H. Parker has been appointed manager of the Butler County Telephone Company, Asgusta, Kan.

F. McKinney, Janesville, Wis., was recently appointed manager of the telephone exchange at Clinton, Wis.

H. B. Stimpson, who has had several years' experience in the engineering departments of the American Telephone and Telegraph Company and Northwstern Telephone Exchange Company, and has also served some time as traveling traffic expert for the former company, was recently appointed superintendent of traffic for the Rocky Mountain Bell Telephone Company, with headquarters at Salt Lake City.

A. F. Mette has been appointed manager of the Automatic Telephone Company, Pontiac, Ill.

William E. Norris, Canton, Ohio, has been promoted to the manager-ship of the Central Union Telephone Company's exchange, at Masillon, Ohio.

Joseph Ogden, manager of the Consolidated Telephone Company's exchange at Pittston, Pa., has been appointed to the management of the company's exchange at Wilkesbarre, to succeed E. W. McGinnis, resigned.

Eben J. Howells has been appointed manager of the Central Union Telephone Company's exchange at Jacksonville, Ill.

C. A. Bloss has been appointed manager of the Union Telephone Company's exchange at Owosso, Mich., having previously been in charge of the company's exchange at St. John, Mich.

Carl Thomas, Algoma, Wis., has been appointed manager of the Wisconsin Telephone Company's exchange at Kaukauna, to succeed H. H. Albright, resigned.

J. F. Shumaker, Burlington, Kan., has been appointed manager of the Coffey County Telephone Company, Waverly, Kan.

Henry L. Sutherland has been appointed assistant general manager of the Interstate Telephone Company's exchange, St. Johnville, N. Y.

J. B. Middleton, formerly manager of the Independent Telephone Company, Bellingham, Wash., has been appointed secretary and manager of the Home Telephone Company, Tacoma, Wash.

E. G. Knight has been appointed manager of the Independent Telephone Company, Bellingham, Wash.

Samuel B. Fowler has resigned his position as engineer of the Sterling Electric Company, La Fayette, Ind., after having been connected with that company for a number of years.

A. S. Hillhouse, Columbus, Ohio, has been appointed general manager of the Austin City Telephone Company, Austin, Texas; Williams County Telephone Company, Taylor, Texas, and the Bell County Telephone Company, Temple, Texas, with headquarters at Austin.

Eugene Crowley has been appointed manager of the Union Telephone Company, at St. John, Mich.

W. A. Winfield has been appointed manager of the Eastern Telephone Company, Halifax, N. S., Canada.

Walter Fisher has been appointed traffic and assistant manager of the Independent Telephone Company, Kankakee, Ill.

George McFarland, vice-president and general manager of the Iowa Telephone Company, has been appointed general manager of the Duluth Telephone Company, the Mesaba Telphone Company and the Northwestern Telephone Exchange Company.

OMAHA, NEB.—Casper E. Yost has been re-elected president of the Northwestern Telephone Company, Minneapolis, Minn.

CONVENTIONS.

The North Dakota Independent Telephone Association will hold its convention at Devils Lake, July 9 and 10.

The Southern Independent Telephone Association will hold its convention at Montezuma, Georgia, July 14.

NEW TELEPHONE COMPANIES.

ALUMWELLS, VA.—The McFadden Telephone Company has been incorporated with a capital stock of $5,000, with the following officers: President, A. A. McFadden; secretary, H. C. McFadden.

DISPUTANTA, VA.—The Disputanta Telephone Company has been incorporated with a capital stock of $5,000. The officers are: President, Thomas Temple; vice-president, A. N. Cooks; secretary and treasurer, J. A. Hobbs.

CLAREMONT, VA.—The Harrison Telephone Company has been incorporated with a capital stock of $5,000. The officers are: President, W. C. Webb, Burrowsville; vice-president, W. W. Rich; secretary and treasurer, E. F. Harrison.

CLOVER, VA.—The Staunton River Telephone Company has been incorporated with a capital stock of $10,000. The officers are as follows: President, W. H. Dorin; vice-president, J. T. Lacy, Scottsburg; general manager, R. H. Fukler, Clover; secretary, W. H. Adkisson; treasurer, G. B. Gibson.

NELSON, VA.—The Aaron's Creek Telephone Company has been incorporated with a capital stock of $5.000. The officers are: President, D. T. Winston; secretary and treasurer, T. B. Nelson.

NORTH YAKIMA, WASH.—The Moxee Telephone Company has been incorporated by Arthur Champoux, Emil Allwardt, Charles A. Schmidt, and John Wayneburg.

PRESCOTT, WASH.—The Prescott Telephone Company has been organized.

VANCOUVER, WASH.—The Vancouver Telephone Company has been incorporated with a capital stock of $150,000 by I. D. Eaton, W. W. McCredie, A. L. Miller, and others.

LA CROSSE, WASH.—The La Crosse Telephone Company has been incorporated with a capital stock of $3,500 by E. S. Knowlton, Albert Guske, and others.

WALLACE, W. VA.—The Wallace Telephone Company has been incorporated with a capital stock of $5,000 by D. C. Bennett, Omar E. Hildreth, and others.

MARLINTON, W. VA.—Articles of incorporation have been filed for the Marlinton and Stony Creek Mutual Telephone Company by P. L. Carter, T. S. Dulany, and others of Onoto.

ALDERDALE, WASH.—The Columbia Telephone Company has been incorporated by Alexander B. Robert, William Warner, and Robert W. Bryan.

PRESCOTT, WASH.—The Prescott Telephone Company has been incorporated with a capital stock of $2,000 by Charles H. O'Neil, and L. Barnum.

CECIL, WIS.—The Cecil and Green Valley Toll Line Company has been incorporated with a capital stock of $2,500 by W. C. Zachow, Henry Koeppen, Henry Boecher, and William Peterman.

OCONTO, WIS.—The Oconto Telephone Company has been incorporated with a capital stock of $5,000, and the officers are as follows: President, George A. Glynn; vice-president, Yarwood Matravers; secretary and treasurer, H. L. Reeves.

TAYLOR, WIS.—The Springfield Farmers' Telephone Company has been incorporated with a capital stock of $6,000 by John Bert, and others.

KEWAUNEE, WIS.—The Kewaunee Telephone Company has been incorporated by R. C. Glandt, and others.

KAUKAUNA, WIS.—The South Greenville Farmers' Telephone Company has been organized with the following officers: President, Louis Pringle; secretary, J. H. Schneider; treasurer, A. G. Mass.

BERGEN, WIS.—The Bergen Telephone Company has been organized with a capital stock of $5,000 by H. S. Anderson, Charles Furst, and A. G. Knutson.

ELEVA, WIS.—The Eleva Farmers' Telephone Company has been incorporated with a capital stock of $8,000 by J. A. Nelson, and others.

BOARDMAN, WIS.—The Boardman Rural Telephone Company has been incorporated with a capital stock of $3,000 by H. Robinson, James McHenry, Thomas Tobin, and August Swanko.

NEW AUBURN, WIS.—The New Auburn Telephone Company has been incorporated with a capital stock of $4,000 by H. McCormick, G. M. Emgebretson, A. J. Amundson, and others.

RIVERVIEW, WIS.—Articles of incorporation have been filed for the Riverview Telephone Company with a capital stock of $20,000 by John H. Perkins, Frank Knight, and D. W. Shoudy.

ABERNATHY, SASK., CAN.—Articles of incorporation have been filed for the Foster Rural Telephone Company; capital stock, $5,000.

THAMESVILLE, ONT., CAN.—The Thamesville Telephone Company has been incorporated with a capital stock of $10,000. The directors of the company are as follows: W. J. Mitton, Camden; T. Marven and J. Coutts of this place.

ODESSA, ONT., CAN.—Articles of incorporation have been filed for the Ernestown Rural Telephone Company by J. F. Dawson and others.

APSLEY, ONT., CAN.—The Apsley Telephone Company has been incorporated with a capital stock of $10,000 by D. Brown and Z. Tucker of Apsley and D. Davidson of Peterborough, Ont.

WILMER, SASK., CAN.—The Wilmer Rural Telephone Company has been organized with the following officers: President, T. M. Leggat; vice-president, Sanford McNeill; secretary and treasurer, Thomas Larkin.

REGINA, SASK., CAN.—The North Regina Rural Telephone Company has been incorporated with a capital stock of $15,000.

HEWARD, SASK., CAN.—The Heward Rural Telephone Company has been organized.

ROSEWOOD, MAN., CAN.—The Rosewood Rural Telephone Company has been organized with the following officers: President, T. F. Morris; vice-president, William Norman; treasurer and manager, Charles Claydon; secretary, W. C. Morris.

CARP, ONT.—The Monk Rural Telephone Company has been organized.

ELK LAKE, NIPISSING DISTRICT, ONT., CAN.—The Silver Belt Telephone Company has been organized with a capital stock of $40,000.

KITTERY, MAINE.—The Canadian Telephone and Telegraph Company has been incorporated with a capital stock of $500,000. The officers are as follows: President, H. Mitchell, Kittery; treasurer, S. J. Morrison, Portsmouth, N. H.

ODESSA, ONT., CAN.—The Ernestown Rural Telephone Company has been incorporated by J. F. Dawson and others.

ALTONA, ONT., CAN.—Articles of incorporation have been filed for the Central Telephone Company, with a capital stock of $40,000. J. Underhill is secretary of the company.

LUMSDEN, SASK., CAN.—The Boggey Creek Rural Telephone Company has been incorporated here.

CARIEVALE, SASK., CAN.—The North Carievale Rural Telephone Company has been organized for the purpose of constructing rural lines.

DRUMMONDVILLE, QUE., CAN.—The Drummondville Telephone Company has been incorporated by N. Garceau and others.

ABERNATHY, SASK., CAN.—The Pioneer Telephone Company has been incorporated with the following officers: President, Elmer Shaw; secretary-treasurer, Arthur Beaman.

PHOENIX, ARIZ.—The Home Telephone Company has been organized with a capital stock of $100,000 and the directors are as follows: Walter Bennett, Charles Goldman, Frank Alkire, Dwight B. Heard, H. S. Waklein, Dr. J. W. Foss, Walter Talbot, C. H. Davidson, P. T. Hurley, O. E. Plath, John Lentz, C. D. Dorris, Barry Goldman, C. H. Pratt and Charles Korrick, all of this city.

BARDSTOWN, ARK.—The Bardstown Telephone Company has been incorporated with a capital stock of $2,000. The officers are as follows: President and treasurer, J. M. Ward; vice-president, L. L. Ward; secretary, H. S. Portis.

SAN GABRIEL, CAL.—Articles of incorporation have been filed for the San Gabriel Valley Home Telephone Company, with a capital stock of $200,000. The incorporators are: H. F. Metcalf, H. V. Carter, Edgar O. Fawcett, E. E. Bailey and W. M. Northrup.

TURLOCK, CAL.—The Farmers' Union Telephone Company has been incorporated with a capital stock of $25,000. The directors are A. Hallner, J. P. Snygg, C. A. Lundell, August Warn and Aaron A. Anderson, of Hillmar Colony, and Peter Erickson and Claus Johnson, of Turlock.

HOLLYVILLE, DEL.—The Indian River Telephone Company has been organized with the following officers: President, J. W. Hunter; secretary, Harry Prettyman; treasurer, Harry J. Anderson.

OLIVER, GA.—The Farmers' Telephone Company has been organized with the following officers: President, R. D. Farr; vice-president, O. H. Marsh; secretary, treasurer and manager, Dr. H. E. Ezell.

JENKINSBURG, GA.—The Jenkinsburg Telephone Company has been incorporated with a capital stock of $200,000 by B. F. Aiken, J. F. Tingle and others.

COLUMBIA, ILL.—The Cahokia Telephone Company has been incorporated with a capital stock of $2,400. H. Reivhenback is among those interested.

MT. VERNON, ILL.—The New Haven Toll Company has been organized with the following officers: President, John Thielman; secretary, Ben Bieker; treasurer, C. G. Bocker, all of this city.

NEW MINDEN, ILL.—The New Minden Telephone Company has been incorporated with a capital stock of $2,500 by H. W. Meinert, C. G. Rinne and W. C. Colimeyer.

PORT BYRON, ILL.—Articles of incorporation have been filed for the Port Byron Telephone Company, with a capital stock of $2,500, by A. Saddoris, W. H. Groh and Samuel L. Woodburn.

WOODHULL, ILL.—The Woodhull Village Telephone Company has been organized with the following officers: President, W. C. Stickney; vice-president, S. W. Howell; secretary, Geo. E. Swanson; treasurer, A. A. Mackey; directors, A. W. Mansfield, W. G. Larson, John M. Anderson and Fred J. Kellogg.

FORT WAYNE, IND.—The Farmers' Washington Township Home Telephone Company has been incorporated with a capital stock of $10,000, for the purpose of operating lines in Allen county. The incorporators are: John Kariger, George E. Stolte, William E. Miner and John S. Oswald.

FOWLER, IND.—The Indiana Union Telephone and Telegraph Company has been incorporated with a capital stock of $100,000, to operate in Benton, Warren, White, Jasper, Newton, Lake and Porter counties. The directors are F. A. DePeyster, C. L. McNaughton and D. P. Williams, all of Indianapolis.

RUSHVILLE, IND.—The Lot Green Telephone Company has been incorporated with a capital stock of $11,000 to operate in this county. The incorporators are Henry Schrader, Amos Blacklidge, Thos. A. Dill, Chas. A. Parsons and Samuel Newhouse.

OSKALOOSA, IOWA.—The Oskaloosa Home Telephone Company has been incorporated with a capital stock of $150,000 by J. S. Appelman and H. H. Evans.

BIG ROCK, IOWA.—The Big Rock Telephone Company has been incorporated by George Knapp, H. W. Kebe and G. A. Barron.

WAUKON, IOWA.—The River Telephone Company has been incorporated with the following officers: President, James McKee; secretary, M. W. Bakewell; treasurer, M. Yeoman.

MARION, KAN.—Articles of incorporation have been filed for the Marion Mutual Telephone Company. Among those interested are J. B. Shields, Taylor Biddle, John Gilbert, R. Williams, H. J. Buschlen and George Thompson.

HEATH, KY.—The Heath Telephone Company has been incorporated by T. M. McGee, O. W. Murphy, A. P. Hill, J. D. Rives, F. M. Kelley, F. V. Kimbrough and A. W. Rickman.

HARDINSBURG, KY.—The Codyville Telephone Company has been incorporated. Branson M. Elkins, J. W. Tabor, N. H. Adlington, T. Allen, Alonzo G. Allen, Overton Basham and J. Cody are the directors.

WINNSBORO, LA.—Articles of incorporation have been filed for the Winnsboro Telephone Company, with a capital stock of $25,000. The officers are as follows: President, A. L. Hills; vice-president, E. D. Smelser; secretary and treasurer, A. A. Marrs.

BROWNVILLE, MAINE.—The Brownville Telephone Company has been incorporated, with a capital stock of $5,000. Edwin W. Johnson is president and treasurer of the company.

ALAMO, MICH.—Articles of incorporation have been filed for the Alamo Mutual Telephone Company with a capital stock of $15,000, to operate in this and adjoining counties. The directors are E. P. Hackley, B. F. Hollowell.

EAST LAKE, MICH.—The Hoxieville and East Lake Telephone Company has been organized by farmers of this vicinity.

COLDWATER, MICH.—Articles of incorporation have been filed for the Coldwater Telephone Company, No. 1, of Barryton. The officers are as follows: President, Royal St. John; secretary, P. Cone; treasurer, Empson Bone; manager, R. Dangerfield; directors, E. D. Delong, T. J. Delong and Francis Bone, all of Crooked Lake, R. F. D. 1.

DRENTHE, MICH.—The Independent Telephone Company has been organized. Among those interested are Dr. A. J. Brower, J. S. Optholt and others.

PORT SANILAC, MICH.—The Thumb Telephone Company has been incorporated with a capital stock of $10,000.

PIPESTONE, MINN.—The Altona-Fountain Prairie Rural Telephone Company has been organized, with the following officers: President, A. E. Harris; vice-president, G. Luschen; secretary, C. H. Warrick; treasurer, P. Mantel.

MOTLEY, MINN.—The Laurel Telephone Company has been organized.

CHINOOK, MONT.—The Co-operative Telephone Company has been incorporated, with a capital stock of $40,000, by Rudolph Hermes, John Brummer, James N. Cook, W. D. Smotherman and R. L. Morris.

GREAT FALLS, MONT.—The Smith River and Castner Coulee Telephone Company has been organized at Truly with the following officers: President, H. B. Ellis; vice-president, I. K. Huntsberger; secretary, Everett L. Hall; treasurer, C. E. Hoag; directors, F. G. Givens, D. H. Evans and F. O. McDonagh.

DORSEY, NEB.—Articles of incorporation have been filed for the Dorsey Telephone Company, with a capital stock of $3,000, by D. D. Miles, William Carson, John T. Brady and others.

GLEN RIDGE, N. J.—The Telegraphtype Company has been incorporated, with a capital stock of $5,000, for the purpose of maintaining telephone and telegraph lines. The incorporators are W. M. Beard, Glen Ridge; W. F. Paret, Essex Falls; M. V. Moran, Jersey City.

HILLSDALE, N. Y.—The North Hillsdale and Green River Telephone Company has been incorporated, with a capital stock of $4,500, by Edward Harrington, Frank J. Shaw, Frank Mercer, Adam Steuerwald, John P. Gilmore and George De Larmater, of Hillsdale; Albert Moore, of Austerlitz.

SPENCERTOWN, N. Y.—Articles of incorporation have been filed for the Spencertown Co-operative Telephone Company, with a capital stock of $1,000, by Derett O. Sawyer and David W. Lasher, of this place, and Henry W. Niles, of Chatham, N. Y.

GIBSONVILLE, N. C.—The Gibsonville Telephone Company has been incorporated, with a capital stock of $5,000, by G. E. Jordan, J. V. Dick and others.

HERTFORD, N. C.—The Belvidere-Hertford Telephone Company has been organized by L. W. Norman, G. W. Gaither and W. G. Gaither, Jr., with a capital stock of $1,000.

CALABASH, N. C.—The Southport and Little River Telephone Company has been incorporated, with a capital stock of $10,000, by M. J. Corbett, M. W. Divine and R. R. Stone.

BERLIN, N. D.—The Lake View Farmers' Mutual Telephone Company has been incorporated by H. G. Fenno, S. H. Darby and A. D. Knapp, with a capital stock of $10,000.

VELVA, N. D.—Articles of incorporation have been filed for the Progressive Farmers' Telephone Company, with a capital stock of $50,000, by Geo. F. Milles, H. F. Harms, M. E. Bowers and others.

BISMARCK, N. D.—The Rosebud and Youngtown Telephone Company has been organized with the following officers: President, Robert Rusch; treasurer, Charles Klusman; secretary, John Holle; directors, Frank Schnelling and Henry Sullivan. Connection will be made with the North Dakota Independent Telephone Company at New Salem.

MCCLUSKY, N. D.—Articles of incorporation have been filed for the Lamont Telephone Company, with a capital stock of $4,000, by Emanuel J. Klundt, Jacob Triehwasser, John H. Regier and others.

GRANO, N. D.—The Grano-Lockwood Telephone Company has been incorporated, with a capital stock of $10,000, by Eugene Mead, of this place, F. S. Randolph and others.

PORTSMOUTH, OHIO.—The Scioto County Independent Telephone Company has been incorporated, with a capital stock of $5,000, by Mark A. Crawford, of this city; G. F. Lauman, of Bear Creek; W. A. McGeorge, of Mt. Joy; William T. Dover, Lucasville; L. Taylor, of Rarden.

COLUMBUS, OHIO.—The National Telephone Equipment Company has been incorporated, with a capital stock of $175,000, for the purpose of manufacturing a new lock-out device. The officers are: President, F. O'Gara; vice-president and treasurer, J. P. Hazelton; secretary, R. C. M. Hastings.

FLORENCE, OKLA.—The Boone Telephone Company has been organized by C. E. McIntosh, A. P. Sparks, T. W. Elliott and others, with a capital stock of $1,000.

ALVA, OKLA.—The Independent Telephone Company has been incorporated with a capital stock of $900. The directors are as follows: G. J. Lenherr, L. T. Fullerton and W. B. Marcum.

OKLAHOMA CITY, OKLA.—Articles of incorporation have been filed for the Crutcho Telephone Company, with a capital stock of $600, by E. A. Wagner, L. M. Warner and G. B. Alguire, all of this city.

HOLLISTER, OKLA.—The Hollister Mutual Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are J. W. Harrington, C. A. Nider, G. O. Winningham, Walter H. Hayward, H. E. Fisher, Samuel Murphy and Gains Roark.

WAURIKA, OKLA.—The Beaver Valley Telephone Company has been incorporated with a capital stock of $224 by H. L. Wilson, L. B. Ogletree and George Cassady.

MADISON, OKLA.—The Madison Rural Telephone Company has been incorporated, with a capital stock of $3,000, by A. V. Tuller, J. W. Hall and others.

BUTTE FALLS, ORE.—The Medford and Butte Falls Telephone Company has been incorporated with a capital stock of $5,000.

BICKELTON, ORE.—The Farmers' Mutual Telephone Company has been organized with the following officers: President, J. B. Andrew; vice-president, Charles Wherry; secretary and treasurer, Dr. Dodson.

WESTFALL, ORE.—The Westfall Valley Telephone Company has been incorporated, with a capital stock of $5,000, by J. D. Fairman, Jay Brenson, Jasper W. Westfall and Charles E. Johnson.

DILLSBURG, PA.—The Dillsburg Rural Telephone Company has been organized with the following officers: President, T. D. Baker; secretary, T. G. Cooke; treasurer, C. J. Dushey.

MILL HALL, PA.—Articles of incorporation have been filed for the Mill Hall and Nittany Telephone Company, with a capital stock of $5,000. W. H. Pifer, Lock Haven, is treasurer of the company.

FENNELTON, PA.—A new telephone company has been organized with the following officers: President, F. P. McBride; vice-president, Isaiah Pontius; secretary, W. I. Sipe; treasurer, P. S. Fennel.

JACOBUS, PA.—The Jacobus Telephone Company has been organized with the following officers: President, G. M. Wolf; secretary, Charles A. Williams; treasurer, L. J. Innerst; directors, H. G. Yost, H. A. Kohler, G. M. Leader, Henry J. Hess and Frank J. Beck.

INDIANA, PA.—Application has been made for a charter for the Elders Ridge and West Lebanon Telephone Company by S. A. Jones, J. T. Cass, A. J. W. Robinson, E. J. Smith, J. H. Henderson, J. F. Hood, T. C. Hood, J. T. McLaughlin.

BEDFORD, PA.—The Friend's Cove Telephone Company has been incorporated, with a capital stock of $10,000. The directors are as follows: C. P. James, Rainsburg; John C. Koontz, D. P. England, Everett, R. F. D. No. 2; S. T. Diehl, Charlesville; Clayton Smith and M. A. Diehl, R. F. D. No. 4, Bedford; Samuel Cessna, R. F. D. No. 4, Bedford.

HURON, S. D.—The Huron Municipal Telephone Company has been incorporated by F. H. Kent, S. P. Malone, Charles E. Koepp, J. R. Hinman, Charles E. Bryant, William Wiebel and J. W. Campbell.

LITTLE BEND, S. D.—A telephone company has been organized at this place with the following officers: President, H. P. Knox, Little Rock; secretary, W. E. Jenkins, Okoboji; treasurer, M. L. French, Onida.

DRESDEN, TENN.—The Farmers and Merchants' Telephone Company has been incorporated with the following officers: President, C. C. Wells; secretary-treasurer, W. T. Killibrew; directors, Oscar McClain, Robert Fowler, Robert Harris, J. W. Boyd, B. Melton, Dr. J. B. Finch.

LEXINGTON, TENN.—The Home Exchange Company has been incorporated by Dr. J. C. Stinson, Center Point; E. L. Fesmire and J. F. Hawthorne, of this place.

MINERAL WELLS, TEX.—Articles of incorporation have been filed for the Crystal City Telephone Company by Louis Phelan, Thomas J. Jordan and Hugh F. Wagley; capital stock, $40,000.

KATY, TEX.—The Katy Telephone Company has been organized by the following persons: L. W. Clardy, W. H. Wheeler, G. W. Douglas, Guy Hubler, J. Post, Dr. M. Stewart, John Wright, J. Alt, M. James, J. Cabanise.

LA WARD, TEX.—The Bay Telephone Company has been incorporated with a capital stock of $1,200 by N. Mitchell, I. Ward and A. C. Jones.

FAIRMONT, VA.—The Harrison Telephone Company has been incorporated with a capital stock of $5,000. The officers are: President, W. C. Webb, Barrowsville; vice-president, W. W. Rich, Fairmont; secretary-treasurer, E. F. Harrison, Fairmont.

MAGRUDER, VA.—The Bruton Telephone Company has been organized with a capital stock of $3,000. The officers are as follows: President, W. L. Schenck, Oak Tree; vice-president, D. A. Powers, Magruder; secretary and treasurer, D. S. Harris, Williamsburg.

ALPOWA, WASH.—The Alpowa Telephone Company has been organized with the following officers: President, W. W. Herrick; secretary, John Ingraham; treasurer, T. H. Robinson.

CHARLESTON, W. VA.—Articles of incorporation have been filed for the National Telephone Company, with a capital stock of $15,000,000. This is

regarded as being a step toward consolidating the present National Company of Wheeling, the Consolidated Company of Fairmont and others into one organization, under the control of John A. Howard and associates.

Alamena, Wis.—The Alamena Farmers' Telephone Company has been incorporated; capital stock, $8,000.

Gold Hill, N. C.—The Gold Hill Telephone Company has been incorporated, with a capital stock of $50,000, by R. D. Coleman, A. V. Clennence and others.

Spokane, Wash.—The Local and Long Distance Telephone Company has been formed in this city with a capital stock of $100,000, to co-operate with the Home and Interstate telephone companies. The officers are as follows: President, F. E. Woods, Coeur D'Alene, Idaho; secretary and treasurer, C. R. Cushman; general manager, L. V. Gray.

FINANCIAL ITEMS.

Chrisman, Ind.—The Portage Home Telephone Company has increased its capital stock to $50,000.

Storm Lake, Iowa.—The Northern Telephone Company has filed an amendment permitting the capital stock to be increased to $20,000.

Ralston, Pa.—The capital stock of the Ralston Telephone and Telegraph Company has been increased from $12,000 to $30,000.

Birdsboro, Pa.—The Conestoga Telephone and Telegraph Company has increased its capital stock from $16,000 to $40,000.

Hillsdale, Wis.—The Hillsdale Western Telephone Company has increased its capital stock from $2,000 to $5,000.

Newton, Wis.—An amendment has been filed by the English Lake Telephone Company increasing its capital stock from $21,000 to $42,000.

Murphysboro, Ill.—The Murphysboro Telephone Company has increased its capital stock from $10,000 to $50,000.

Minot, N. D.—The Minot Light and Telephone Company has increased its capital stock from $100,000 to $200,000.

Champaign, Ill.—The Home Telephone Company, of Champaign County, has increased its capital stock from $200,000 to $250,000.

RATES.

Indianapolis, Ind.—The Indianapolis Telephone Company has instituted a new schedule of rates, single line service being $6 per quarter, party line service $4.50, single line business $13.50 and two-party line business service $9 per quarter.

Des Moines, Iowa.—The Mutual Telephone Company announces to its subscribers that an increase in the rates of its service takes effect July 1.

Papilion, Neb.—The Home Telephone Company, of this place, has been allowed to reduce its rates to South Omaha from 15 to 10 cents to meet rates of the Nebraska Telephone Company.

Norfolk, Neb.—The Nebraska Telephone Company has been given permission to reduce the price of individual residence telephones at this place from $24 to $18 a year, and the price of two-party telephones from $18 to $15.

Plattsmouth, Neb.—The Nebraska Telephone Company has reduced its rates on individual business telephones in Plattsmouth from $36 to $30 a year and on individual residence telephones from $24 to $18 a year.

Norfolk, Neb.—The Norfolk Long-Distance Telephone Company has reduced its rates between Norfolk and Meadow Grove and between Norfolk and Pilger.

FRANCHISES ASKED AND GRANTED.

Paragould, Ark.—A twenty-year franchise has been granted the Marmaduke Telephone Company to construct and operate a telephone system in this place.

Prescott, Ariz.—The Arizona Overland Telephone Company has secured a franchise to construct a long-distance telephone line in Arizona, New Mexico and California, with headquarters at this place. The estimated cost is $250,000.

Jerome, Ariz.—A twenty-five-year franchise has been granted the Arizona Overland Telephone Company by the city council.

Phillipsburg, Kans.—The Farmers' Union Telephone Company has been granted a franchise here.

Mazeppa, Minn.—The Goodhue County Telephone Company has been granted a franchise to operate in this place.

Hoytville, Ohio.—The Wood County Telephone Company has been granted a franchise in this city.

Spencerville, Ohio.—The Jennings Telephone Company has been granted a franchise to extend its line into this place.

Jacksonville, Ore.—The Citizens' Telephone Company has been granted a twenty-year franchise by the city council.

Sterling, Ill.—The Central Union Telephone Company has been granted a franchise for twelve years, the rates as now charged by the company to remain the same, but the city secures other very important concessions.

Frankfort, Ky.—The Frankfort Home Telephone Company has secured a franchise to operate a telephone exchange in this city.

MISCELLANEOUS.

Glenwood, Ark.—The Glenwood telephone system has been purchased by J. H. Howard, who will greatly improve the same.

Pratt City, Ala.—The People's Telephone Company contemplates the expenditure of $5,000 in improving its system.

Winter Haven, Fla.—C. H. Eyclesheiner has purchased the telephone system in this place.

Bainbridge, Ga.—The Brinson Telephone Company and the Colquitt Telephone Company have been absorbed by the Bainbridge Telephone Company.

Montpelier, Idaho.—A fire alarm telephone system will be installed in this city.

Ridgefarm, Ill.—The Vermillion Telephone Company is planning to rebuild its local system.

Des Moines, Iowa.—The Mutual Telephone Company contemplates the expenditure of $30,000 in improving its system during the season.

Grinnell, Iowa.—The Interior Telephone Company is planning to expend about $20,000 in improvements.

Lawton, Iowa.—The Lawton Telephone Company has purchased the property of the Banner Telephone Company.

Waukon, Iowa.—The Waukon Telephone Company is planning to rebuild its system.

Inwood, Ind.—The local telephone system has been purchased by George Long.

Elkhart, Ind.—The Lake Shore and Michigan Southern Railroad will establish a system of telephones for train dispatching between Toledo and this city.

Indianapolis, Ind.—The New Telephone Company will erect an exchange building on a site recently purchased at a cost of $29,000.

Rochester, Ind.—The Rochester Telephone Company is making arrangements to install a new complete common battery multiple central office equipment, as well as other improvements.

West Union, Iowa.—The West Union Telephone Company will construct additional lines.

Houghton, Iowa.—The German-American Telephone Company has changed its headquarters from Mt. Hamill to Houghton and has increased its capital stock from $3,000 to $50,000.

Humeston, Iowa.—The Humeston Telephone Exchange has been purchased by George O. Gardner.

Williams, Iowa.—The Ellsworth Telephone Company will install a switchboard here.

Pine Top, Ky.—The Carr's Fork Telephone Company will construct additional lines.

Sergent, Ky.—N. Starkey is interested in the construction of a telephone system in this place.

St. Louis, Mich.—The Union Telephone Company is preparing to replace its wires with cables at an estimated cost of $20,000.

Madison, Neb.—The Madison Telephone Company and the Farmers' Independent Telephone Company have been consolidated. The system will be improved.

Clarksburg, W. Va.—The Consolidated Telephone Company contemplates the installment of a new plant with modern equipment in every respect.

Prosser, Wash.—The franchise and entire equipment of the Prosser Telephone Company has been purchased by the Benton Independent Telephone Company.

Kendall, Wis.—The Kendall exchange, formerly owned by the Elroy Telephone Company, has been purchased by A. H. Haskins.

Radisson, Wis.—The Rice Lake and Northwestern Telephone Company will construct additional lines.

Otoville, Cal.—The Pacific States Telephone and Telegraph Company will expend $10,000 in improving its system in this vicinity.

Sterling, Ill.—The Bell Telephone Company will rebuild its system in this city.

Jackson, Miss.—The Cumberland Telephone and Telegraph Company is preparing to spend $60,000 in the improvement of its Jackson exchange and cable lines in the city.

Marshall, Mo.—The entire stock of the Saline County Telephone Company has been purchased by the Missouri and Kansas Telephone Company.

Scranton, Pa.—The Bell Telephone Company plans to spend $100,000 in the improvement of its plant in this city.

Rutland, Vt.—The Vermont Telephone Company announces that it will spend $60,000 in the improvement of its lines and exchanges in Montpelier and Barre.

Milwaukee, Wis.—About July 1 the Wisconsin Telephone Company comes into possession of the Fort Atkinson exchange, and about the 15th will absorb the Racine exchange.

Milwaukee, Wis.—The Wisconsin Telephone Company will erect a new exchange building on Sixty-fourth avenue.

Albany, N. Y.—A certificate has been filed merging the Southern New York Toll Company with the Independent Union Telephone Company.

New York, N. Y.—The Public Service Telephone Company, recently organized, has applied for space in the ducts of the Empire City Subway Company, with a view to installing an automatic system.

Williston, N. D.—J. J. Delaney and H. C. McCartney, owners of the local exchange, will expend about $40,000 in extending and improving their toll lines.

Cadiz, Ohio.—The Harrison and Jefferson Telephone Companies have been consolidated and will make extensive improvements.

Glenburg, N. D.—The Lone Star Telephone Company will construct additional lines.

Logan, Ohio.—The Logan Home Telephone Company will install a new switchboard.

Kaw City, Okla.—The local telephone system has been purchased by D. R. Puckett.

Fishertown, Pa.—John Faint, formerly division manager of the American Union Telephone Company, of Harrisburg, Pa., has leased the company's exchange at this place and is planning many improvements and extensions to the system.

Snyder, Tex.—The Scurry County Telephone Company, recently organized, has purchased the Texas and Pacific Company's exchange at this place. R. N. Miller is president of the company and George T. Curtis vice-president and general manager.

Brownwood, Tex.—The West Texas Telephone Company will install a new exchange building in this place; also do considerable cable work.